

YOUR COMPUTER

FOR BUSINESS AND PLEASURE

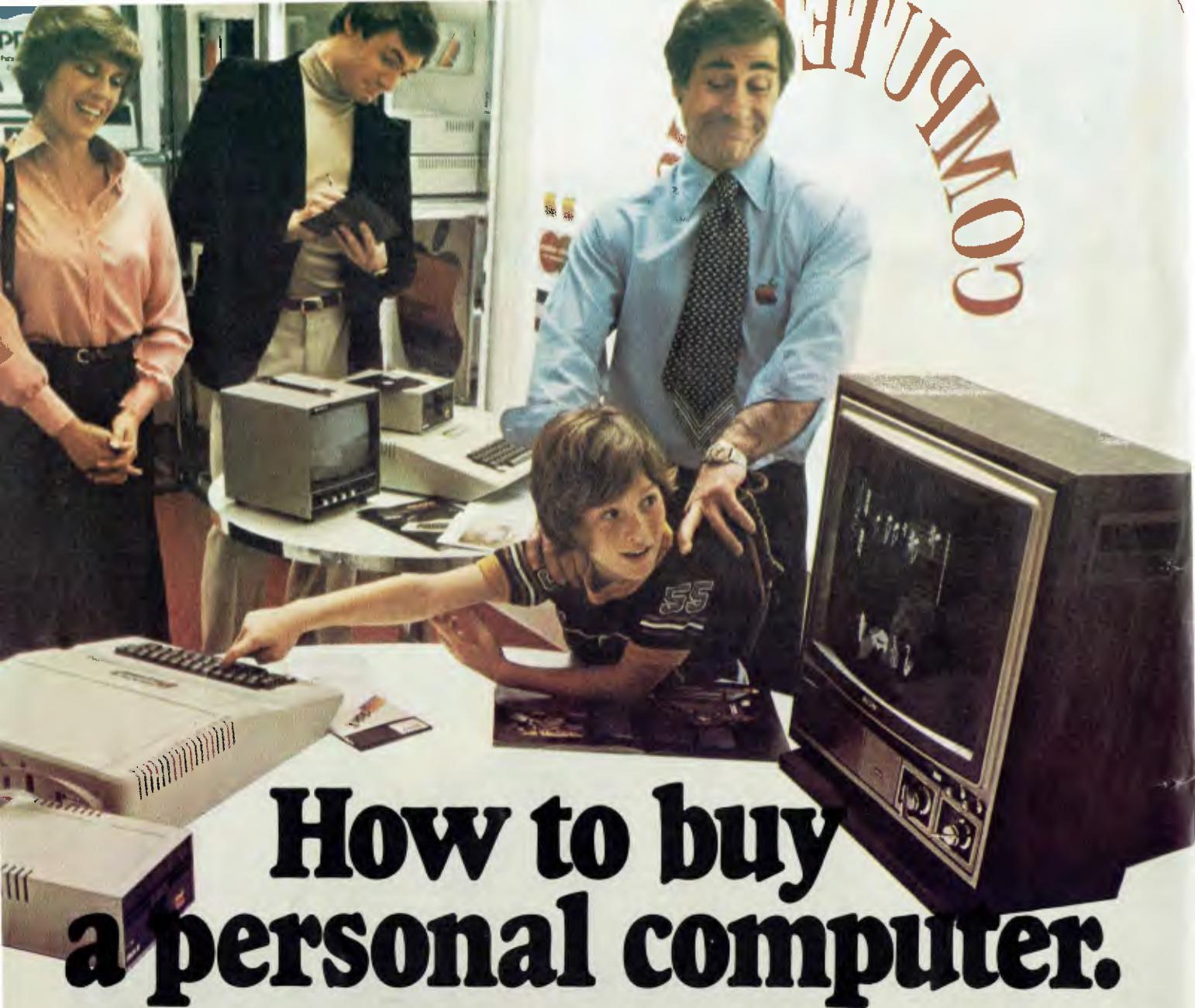
\$2*
NZ \$3 August 1981



Slashing the Cost of Home Computing!

**COMMODORE VIC • ATARI 400/800 • SINCLAIR ZX81 • COMPUTER
COURSES FOR BEGINNERS • ADVENTURE GAMES • SOFTWARE REVIEWS
• VISICALC, AN EXECUTIVE'S BEST FRIEND • COMPUTER CLINIC**

COMPUTER



How to buy a personal computer.

In California, a store owner charts sales on his Apple Computer. On weekends though, he totes Apple home to help plan family finances with his wife. And for the kids to explore the new world of personal computers.

A hobbyist in Michigan starts a local Apple Computer Club, to challenge other members to computer games of skill and to trade programs.

Innovative folks everywhere have discovered that the era of the personal computer has already begun—with Apple.

Educators and students use Apple in the classroom. Businessmen trust Apple with the books. Parents are making Apple the newest family pastime. And kids of all ages are finding how much fun computers can be, and have no time for TV once they've discovered Apple.

Visit your local computer store

The excitement starts in your local computer store. It's a



friendly place, owned by one of your neighbors. He'll show you exactly what you can use a personal computer for.

What to look for

Your local computer store has several different brands to show you. So the salesman can recommend the one that best meets your needs. Chances are, it will be an Apple Computer. Apple is the one you can program yourself. So there's no limit to the things you can do. Most important, Apple's the one with more expansion capability. That means a lot. Because the more you use your Apple, the more uses you'll discover. So your best bet is a personal computer that can grow with you as your skill and involvement grow. Apple's the one.

It's your move

Grab a piece of the future for yourself. Visit your local computer store. We'll give you the address of the Apple dealer nearest you when you call our toll-free number. Then drop by and sink your teeth into an Apple.



AUSTRALIAN DISTRIBUTOR

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55 CLARENCE ST., SYDNEY, NSW 2000
TEL 290 2422

apple computer



inside your computer

AUGUST 1981

news

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Your Computer News

Our roundup of the latest in software and hardware, new and upcoming releases and happenings in the world of microcomputers.

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The Cost Cutters

Low-priced, high-performance newcomers are bringing the home computer within everyone's reach. Three releases: Commodore VIC 20 — the \$399 colour computer; Sinclair ZX81 — Better all-round, and still setting trends; Atari 400/800 — The long wait is over.

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Office automation and computerisation can provide new hope for the handicapped. We look at a special computer training scheme for the disabled.

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Delving Deeper into CP/M

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Microcomputer prices are crashing — and you get the benefit... Read about it on Page 18

editorial



AS MOST OF our readers have probably discovered by now, personal computing is not a low-cost activity. Computer equipment is expensive, although prices are dropping. Consumables such as ribbons and paper are not cheap either. Then there's software and magazines, books and other miscellaneous items — it's possible to literally spend a fortune in this game.

What particularly annoys me is the present situation which we are suffering at the hands of the Bureau of Customs. At the present moment, imported floppy disks have a duty imposed of 35 percent. Without going into the pros and cons of tariff protection of local manufacturers, I do contend that this is simply too high.

I have heard of recent cases where commercial users, faced with huge cost increases on the expensive, high-quality disks they were using, have switched brands and suffered increased drop-outs and loss of data as a result.

But to add insult to injury, duty is applied to software packages at the same rate. In other words, if an importer brings in a software package consisting of a program stored on a diskette, plus accompanying documentation, then duty is payable on the value of the entire package, not just on the \$5 value of the diskette. Yet the same program, in printed form, is free of duty.

This is clearly inequitable. Software vendors will not release source code for their programs for obvious reasons. Therefore the end user has no choice but to pay over the odds for software because of duty paid almost by default. The Bureau of Customs has added new meaning to the term software piracy.

Many computer users, retailers and wholesalers are protesting the duty; hopefully something will be done about it. But the more voices the government hears, the better — so join them by writing to your Federal member of parliament, pointing out the inequities of the system as it stands and asking for the duty to be applied only to the diskette, if at all.

If you don't, you may continue paying up to 50 percent more than you need for your programs — or find out that the ones you want are no longer available because the importer couldn't sell enough copies at the inflated price.

Act now, before it's too late!

Les Bell

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APPLE BUSINESS SYSTEMS

Few computers can match the power and versatility of the APPLE II as a business computer, and nowhere will you see that power better demonstrated than at C.P.C. We have the finest software and equipment, and the experience to make your computer installation a success. As Authorised APPLE Dealers, we offer a complete support to all our customers. In addition we have our own special "same day" backup service which keeps our business users operational and productive. Call in at C.P.C. to get the full story of how our business systems can help you.

SOFTWARE

SIX '\$' SOFTWARE: We are proud to be agents for this superb Australian software, written in PASCAL for speed and efficiency

	\$ 745.00	WITHOUT TAX	WITH TAX
DEBTORS	1345.00	APPLE II PLUS, 48K	\$1435.00 \$1634.00
DEBTORS + INVENTORY	1345.00	DISK II WITH	
CREDITORS	745.00	CONTROLLER	- 684.00 786.60
CREDITORS + GENERAL LEDGER	1345.00	DISK II ADD-ON	515.80 594.32
AUSTRALIAN PAYROLL	720.00	SANYO MONITOR	305.00 340.00
MEDICAL PACKAGE	745.00		2939.80 3354.92
INSURANCE BROKERS PACKAGE	1345.00		

Other Business Software:

VISICALC - the most useful management tool available on any computer (DOS 3.3)	\$ 220.00	PASCAL LANGUAGE SYSTEM	470.25	540.00
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SANDY'S WORD PROCESSOR	195.00	MICROSOFT Z80 CARD WITH CP/M	325.00	375.00
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O.B. MASTER, database from Stoneware	230.00			
DATA FACTORY	200.00			
MARKET CHARTER - Stock market	130.00			

ATARI COMPUTER SYSTEMS



FEATURES & SPECIFICATIONS – THE ATARI 800

Console: FCC approved, with built-in RF modulator. Connects to any TV.
 CPU: 6502 Microprocessor. 0.56 microsecond cycle. 1.8 MHz.
 Colour: 16 colours, each with 8 intensities.
 Sound: Four independent sound synthesizers (in addition to audio through TV) for musical tones or game sounds. Four octaves. Variable volume and tone. Internal speaker.
 Memory: 16K bytes of Random Access Memory is included. The ATARI 800* may be expanded up to 48K RAM with user-installed 8K or 16K ATARI Memory Modules*. The system includes a 10K ROM Operating System. ROM may be expanded with user-installed cartridge programs.
 Keyboard: 57 full-stroke alphanumeric keys plus 4 function keys. Upper/lower case. Inverse video. Full screen editing.
 Display: Highest graphics resolution 320 x 192. 24 lines of 40 characters. Three text modes.

PERIPHERALS & ACCESSORIES
 ATARI 410* PROGRAM RECORDER
 ATARI 810* DISK DRIVE
 ATARI 815* DUAL DISK DRIVE
 ATARI 820* 40 COLUMN PRINTER
 ATARI 822* 40-COLUMN THERMAL PRINTER
 ATARI 825* 80 COLUMN PRINTER
 ATARI 830* ACOUSTIC MODEM
 ATARI 850* INTERFACE MODULE
 8K RAM MEMORY MODULE* (CX 852)
 16K RAM MEMORY MODULE (CX 853)
 * TRADE MARK

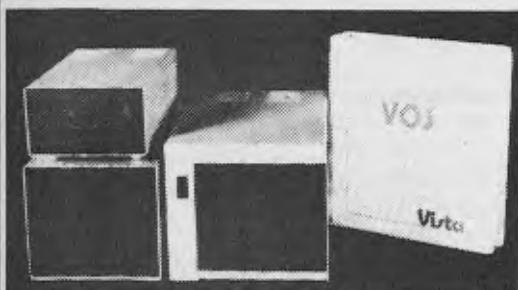
Vista V200-E for Exidy*

Minifloppy Disk Systems

Description

The V200-E for Exidy/Sorcerer® is a dedicated system and a long needed powerful tool to complete the Exidy Computer. The V200-E for Exidy is a completely tested and assembled modular system that does not require the S100 Expansion Interface and plugs directly into the expansion connector.

The fast-access, on-line storage of the V200 and V200-E system gives you instantaneous program loading and dumping, sequential and random file access, context edit of programs and text, dynamic debugging of programs, program assembly, batch processing and much more.



Here are three options available:

V200-E-10 200K single drive, in a dual drive case to allow for expansion, ready to plug into the Sorcerer with CP/M, BASIC E, full documentation and a box of disks. \$990.00

V200-E-20 400K dual drive, complete and ready to plug into Sorcerer, with CP/M, BASIC E, documentation and disks. \$1450.00

V200-E-22 800K dual double sided disks, ready to plug into the Sorcerer, with CP/M, BASIC E, documentation and disks. \$1850.00

No other system offers such value for money. Already the major software houses are arranging to supply software on Vista format disks, and the CP/M operating system opens the door to even more.

Write or phone today for our free fact sheet and price list on the VISTA V-200 Disk System.

City Personal Computers

75 CASTLEREAGH STREET,
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 Phone: (02) 233 8992

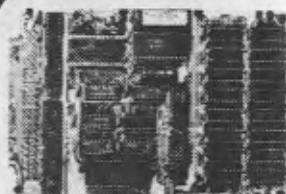


commodore

SYSTEM-80



PET/KIM 32K RAM EXPANSION



Compatible with the Commodore PET, KIM, AIM and SYM computers, this is a new board giving 32K RAM expansion. All RAM is supplied, fitted and tested, and the unit is ready to connect.

RAM used is top quality Dynamic RAM and power is taken from the computer motherboard. Please specify computer when ordering.

32K RAM expansion board

\$445.00

TRS-80/SYSTEM 80

DATA ENHANCER – Small but very useful device for all System 80/TRS-80's using cassettes. Enhances the signal of program tapes to improve loading reliability. Can be used on input, or between two recorders to create improved copy. Comes complete with leads and all instructions.

\$49.95

SEIKOSHA PRINTER – 30 cps dot matrix printers with two sizes of print and graphics capability.

\$495.00

MICROSOFT EDITOR ASSEMBLER PLUS

39.95

MICROSOFT BASIC LEVEL I

59.95

MICROSOFT BASIC COMPILER

215.00

NEWDOS 80

149.00

ADVENTURE (MICROSOFT)

34.95

TOUCH TYPING TUTOR

16.95

SARGON II

39.95

DEATHMAZE 5000

15.95

LABYRINTH

15.95

LUNAR LANDER

15.95

BOOKS

19.50

MICROSOFT BASIC DECODED AND OTHER MYSTERIES

29.95

TRS-DISK AND OTHER MYSTERIES

72.50

your computer news



More from Datapoint

DATAPPOINT has announced its largest processor yet, the 8800. Based on a discrete logic 16-bit processor, the 8800 uses multiple Z-80s as I/O controllers, each with up to 64K of independent memory, to control the peripheral devices such as disks, tapes and communications devices.

The method of off-loading time-consuming peripheral control tasks allows the main processor to devote itself to actual processing tasks, while supporting up to 24 workstations. Although it is a 16-bit machine, the processor can actually execute object code for Datapoint's earlier 8-bit computers.

The 8800 is able to function as part of a Datapoint Attached Resource Computer system, which directly links all the system components with coaxial cable and allows users to share the same disk files, printers and other peripheral devices without having to be concerned about where the devices are physically located, whether anyone else is using them and which functions correspond to which files.

□

New Computerland Store

COMPUTERLAND, the giant retail computer store chain which started in the US six years ago, now has stores opening around the world at the rate of six every month. Store number two hundred probably opened some time in July.

In fact, No. 200 could well be the Gold Coast Computerland. The new store is owned and managed by 30-year-old Queenslander Paul Rees, who opened the Brisbane store two and a half years ago.

Since then, the Brisbane store has consistently been one of Computerland's most successful — in fact the top outside America — and Paul expects the new store to continue the pattern.

Further details from Computerland, 126 Scarborough Street, Southport, QLD 4215, Phone (075) 32 8300.

In Sydney Computerland has opened its third suburban store, this time in Parramatta.

Store manager Mr Ray Green, a chartered accountant turned computer professional, is offering advice to

businessmen on the best use of his range of soft and hardware in the office or home.

He says he will be offering Apples, Cromemco Systems and a wide range of other equipment.

□

What's a GRAFPACK?

SYDNEY software house Cybernetics Research has announced the release of its first package, GRAFPACK 1.0. This package, which will only work on machines with Applesoft and 48K of RAM, provides 30 new BASIC commands, not limited to graphics as you might think.

A Hi-res character set with lower case is provided, and screen handling commands allow the user to switch between the various screens. A window can be set to scrolling or paging mode, and can be overwritten or merged with new data. Cursor addressing is implemented.

GRAFPACK 1.0 adds store and load numeric array functions to DOS and also allows the loading and merging of multiple shape tables. Other Applesoft enhancements include fast GOTO and GOSUB; (using an incremental compilation technique), RESTORE, 16-bit POKE and PEEK, & INPUT, which is equivalent to the LIE INPUT found in Microsoft BASIC, and others.

A version of PRINT USING is also implemented, using the COBOL PICTURE statement. Finally, GRAFPACK provides sort, music, editing, physical disk and monitor functions. Some useful graphics utilities are also included.

GRAFPACK 1.0 is available from your computer store, or contact Cybernetics Research direct on (02) 698 8286. It retails for \$95.00.

The AED Supercomputer Driver
AED Microcomputer Pro-

ducts has developed an extensive support software package for the powerful SSM VB3 video card, which it also supplies.

AED has been developing this package for 18 months at an expenditure of over \$50,000.

The software comprises a powerful video driver, a prime level monitor, keyboard handler, plus extensions to the CP/M disk operating system.

The Monitor program is accessible instantly, even from within a program running under a program running under CP/M. When finished with the monitor, a single key returns the user to the CP/M task he was previously involved in, without any screen disruption. Many other advanced features are provided. AED believes these are not available anywhere else in the world, even on mini and mainframe systems.

This software system is called SUPERAED and costs \$100.

AED also has a software-hardware package based on the VB3 called the "Un-Serial" terminal. This uses the VB3, SUPERAED, a wide bandwidth green phosphor video chassis, the Honeywell 103 Hall Effect keyboard, and is available in three attractive case styles.

The Un-Serial terminal provides terminal intelligence beyond that of normal intelligent serial terminals, however standard serial terminals can be simulated and even during simulation, screen speed is higher than the original.

For more information contact AED Microcomputer Products at 130 Military Rd, Guildford, 2161. Phone (02) 681 4966

□



Off-the-peg IBM

IBM (REMEMBER IBM?) has taken a new direction in the marketing of its office products by opening its first retail store in Australia. The store, called The IBM Shop, opened on August 4th at 97 Pitt Street in Sydney, right next to Australia Square.

The shop sells only IBM products (after all, who needs anything else?). Initially, it will stock a range of typewriters, including the electronic and memory typewriters, and the

IBM Displaywriter, IBM's latest word processor offering. Supplies such as ribbons, tapes, diskettes and other accessories are also available.

At the moment, there are no plans to sell computer equipment through the store, although with the recent announcement of the System 23 computer in the US, which breaks the \$10,000 barrier for IBM equipment, the possibility cannot be entirely excluded. A store is planned for Melbourne early next year.

Magmedia Change

MAGNETIC MEDIA services, the people who bring you Verbatim disks, has decided its name is too long, and that henceforth it will be called just Magmedia.

All the company's stationery, advertising, delivery vans, and so on will be changed to carry the new insignia. It will also appear on products, such as the Dure-link furniture for which Magmedia is exclusive distributor, as well as tapes, disks, digital cassettes, storage items and ancillary stationery.

Recently Magmedia provided us with an opportunity to meet Jacques Boivin, Verbatim's Geneva-based Directeur Technique. In addition

to proving an excellent raconteur, Jacques was able to fill us in on recent developments in the standardisation game, particularly with regard to 5½ inch floppies.

Apparently, the various companies who are represented on the ECMA (European Computer Manufacturers Association) have been able to agree on a set of three standards for the formatting of minifloppies. Well, almost; ICL is still holding out for double density on track 0 although everyone else has happily agreed that it should be single density. Nice to see the Poms can be as pig-headed and non-standard as we have been. (Remember channel 5A!).

Adelaide Moves In...

THE VACUUM left by the closing down of the Computerland franchise in Melbourne has been quickly filled by an Adelaide company.

Random Access Computer Sales and Service, which has been setting new sales records for Apple Computers and products in Adelaide, has opened its doors in Melbourne at the former Computerland site.

The company is an authorised Apple dealer and service centre, and an accredited agent for Archive Computers, Qume, ITOH and Epson MX-80 printers.

The Random Access Centre will also offer a wide range of locally written and tested business and commercial software suitable for the Apple machine.

Random Access moved into the former Computerland premises at 555 Collins Street, and is offering the

former tenant's customers continuity of supply and service.

The company's dynamic managing director, Mr Peter Kuebler, agrees the move is a bit of a step in the dark.

"Anyway the city's many existing Apple users need software and service support, and we are qualified and able to give it," he added.

"We are experienced programmers and can offer tailor-made software for the client, and the superior Andromeda business software, which is locally designed and supported."

"With our Andromeda range and the imported software, we are able to offer one of the most comprehensive ranges of software compatible with Apple in Australia," Mr Kuebler said.

Other specialist packages include a special program for Insurance Brokers, and a Veterinary Hospital billing and accounting system. □

Toshiba WP

TOSHIBA (Australia) Pty. Ltd. has announced the release of its first word processor for the Australian market, the Model EW-100.

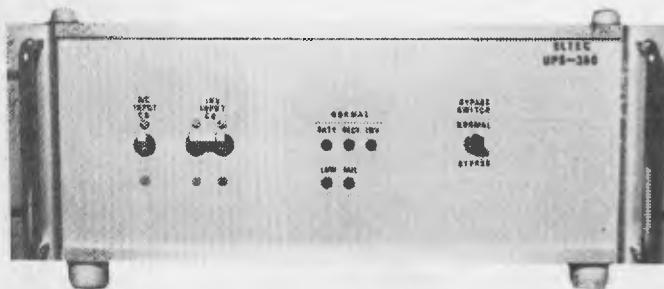
The system seems to do all the usual things, including global search and replace, super and sub-scripts, automatic word-wrap, centering, decimal tabs, underscoring, shadow and boldface print, and headers and footers.

Prestored words and phrases can be included into new texts using the glossary function, and the system will perform hyphenation.

The display is 80 × 24 with an 8 × 8 dot matrix character set, while the printer is a 45 cps daisywheel type.

For further information, contact: Toshiba (Australia) Pty. Ltd., 82-94 Talavera Road, North Ryde, NSW 2033. Phone (02) 887 3322.





Non stop Australian power

THE DEFOREST Software group have produced an uninterruptible power supply suitable for all microcomputers.

The new unit, which is Australian designed and built, is likely to take the heartache out of software use where power surges are a problem.

The unit, called ELTEC, costs about \$1400 with sales tax.

The whole system is a back up to commercial line, with a battery reservoir and a conversion system that produces continuous top quality A.C. power.

The reservoir is claimed to have the capacity to keep equipment operation from five minutes to 15 hours (depending on the secondary storage) when the commercial power fails.

For more information contact DeForest Software, 26 Station Street, Nunawading, Victoria, (03) 877 6946. □



New Sanyo

SANYO'S new MBC 3000d has a 64 Kbyte RAM main memory with a 4 Kbyte I/O memory, and 4 Kbytes of ROM for both main and local I/O memories. The keyboard

is a detachable ASCII type with 22 programmable function keys.

The data storage system comprises two 8-inch double-sided double-density disk drives with 1 Mbytes per drive. Two external drives can be connected through the floppy disk controller.

The MBC 3000D has a green 12-inch, non glare screen with an 80 character display of 24 lines. Standard characters are 6 × 9 dots with 8 × 12 dots for graphic elements.

Display modification offers facilities for inverse, flashing, over-line, under-line, highlight, secret or any combination of these.

Expansion and communication is through RS-232C (2 ports) in asynchronous mode or optional synchronous mode.

The printer interface is to Centronics parallel specifications.

The MBC 3000D is designed for CP/M, now virtually the standard operating system for microcomputers. It is claimed that there are now over 1600 public domain programs available and another 1500 commercially available software packages. CP/M now offers the largest range of applications software in existence.

Roger Price, Sanyo's Office Machines' Data Processing Product Manager, says that "anyone using the MBC 3000D microcomputer now has access to suitable local software for any application.

The range of standard software packages includes

general ledger, accounts payable/receivable, stock control, financial planning and modelling, word processing, payroll, cost accounting, statistics and engineering," he says.

"Sanyo Office Machines can arrange for special software to suit any unusual application or non-standard accounting system."

The company claims the MBC 3000D has wide market appeal, finding ready application in small businesses, accounting, word processing and financial modelling. Sanyo Office Machines has taken particular care to ensure that a full range of software designed for Australian businesses is available at the same time as the release of the MBC 3000D.

For further information contact Sanyo Office Machines at 127 Walker Street, North Sydney. □

Thinking Big

FOR THOSE whose needs just can't be met by an Apple and a minifloppy, the answer may be a bigger machine. For the ultimate in minicomputer performance, a few manufacturers are now producing 32-bit minicomputers with a performance that exceeds that of many mainframes.

An example of this would be the Perkin-Elmer 8/32 'Megamax' machines. Traditionally a supplier of systems for engineering, scientific and technical applications (for example, real-time flight simulators, power plant process control), Perkin-Elmer's Australian operation recently pipped its US parent to the post by announcing a commercial software package. Called Megamax, the system will cater for the needs of most businesses in the over \$10 million turnover bracket.

The COBOL-based package, which was originally written by Newcastle soft-

ware house NCS, comprises seven modules: Accounts Receivable, Accounts Payable, General Ledger, Inventory Control, Order Entry, Sales Analysis and Purchase Orders.

Megamax runs under the Perkin-Elmer operating system Reliance II, which has some very interesting system recovery and restart features — you can pull the plug out on the computer, and when it is powered up again, it will continue where it left off.

For further details, contact Perkin-Elmer Data Systems, 3 Byfield Street, North Ryde, NSW 2113. Phone (02) 887 1000. □

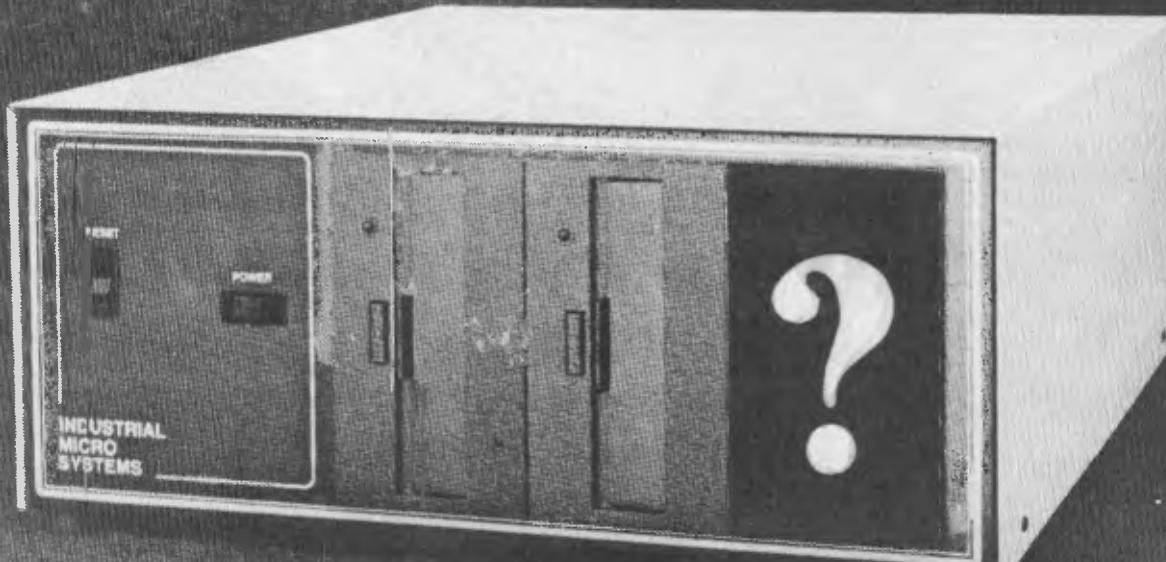
Build a Computer

IF YOU have \$110 and the ambition to build your own colour computer, the Wollongong Computer Club can help — once it has sufficient starters the club plans to run a course of instruction with expert supervision.

The cost of the course includes the materials for the colour computer, supervision and instruction while building it and instruction in its use. The offer is open to everyone; it's not necessary to have any previous experience or knowledge of electronics, computers or kit construction as the course starts from the basic use of a soldering iron, concluding with the successful completion of your own colour computer.

There should be great satisfaction in completing the course and finally doing your own programming. The computer will plug into any television and cassette player, has cassette and audio output, is expandable and, best of all according to the club, costs next to nothing.

Anyone interested in taking the course should contact Paul Janson at PO Box 397, Dapto, 2530. Phone (042) 61 5451. □



over you may have guessed it
6Megabyte on a  5000

**But it's the speed & reliability
that counts**

The IMS5000 with hard disk was benchmarked against all the other hard disk systems at the NCC Chicago USA '81 exhibition. On average the 5.25 inch hard disk operates 15% faster than 8 inch Winchesters and up to 5 times faster than other 5 inch Winchesters, and it will not cost a fortune.

The demonstration system at the NCC was dropped and punctured in transit by a forklift, and it still came up first time without an error! This is the rugged reliability users have come to expect from IMS International Computers.

Isn't this what you NEED? - A machine so reliable, its manufacturers warrant it for TWO years.

**SERIES
8000**

**SERIES
5000**

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BRISBANE:	IAN BENNETTS		(07)	52-8455	

*For some honest advice on
your requirements, call:*


**INTERNATIONAL
COMPUTERS**

A machine so versatile, it operates under CP/M, MP/M, MUT-EFFAMOS, UCSD-PASCAL, MARC, MICROCOPOL;

Yet a machine which is inexpensive and powerful.

What system are you looking at purchasing? IMS I hope is at least on your short list. If not, Contact SI Micro and discuss your requirements with them. (The face is becoming familiar).

Educate the educators

AT LAST, a simplified system to teach computer operation and programming has been produced in Australia.

Zenith Education Systems basically allow a teacher or instructor to create a lesson which is structured to guide a student through questions and information relating to a particular topic.

The ZES system is a completely menu driven system which utilises self explanatory prompts defining information required from the user.

The system not only allows a user to create lessons and associated features, it also allows the user to amend any or all of the information entered.

The basic package contains a 114 page manual, three disks and input sheets.

The program disk is the major component of the ZES system, and contains the lesson creation programs and the student reporting system.

The graphics disks contain the programs which allow the user to create animated diagrams and graphic shapes. The Module disk is used to store the lesson.

The whole system retails at \$250 and is available for Apple II or Apple II Plus microcomputers with 48K of memory and one disk drive.

For further information contact Zenith Education Systems, PO Box 505, Bankstown, NSW 2200. Phone (02) 708 3140

CISA Moves to Silicon Valley

CISA Microcomputers is about to open a new store in Sydney's York Street, which is fast turning into Australia's own Silicon Valley.

The new showroom, at 89 York Street, is only four doors away from Tandy's computer store and within sight of Dick Smith's and Computerland Sydney.

Due to open on September

1, CISA's new operation is expected to have the biggest range of TRS-80 hardware and software on display in Australia.

It will have three demonstration systems set up, from hobbyist level to a full business package, and should also feature displays of CISA's specialist TRS-80 modifications — Hi-Res graphics, 48K memory-in-the-keyboard expansion, and a high-speed modification using a 5.3 MHz processor that more than doubles the Tandy unit's speed.

CISA will sell a wide range of software as well as several magazines, some of which are otherwise unavailable here. These include 80-US, the popular TRS-80 users magazine which is normally available on subscription only even in the States. The company also expects to be able to show the first module of its comprehensive accounts package.

Shugart SA1000 Winchester Disk in Local Computer

CLAIMING to be the first Australian company to use the new range of Winchester fixed disks, Sandell Computer of Paramatta has launched a microcomputer SD101.

The 64K SD101 is built on the S-100 bus principle and can accommodate up to five users.

It can be configured with one SA1000 series drive and one floppy for software transfer and back-up. Supplied peripherals include Sanyo CPX 1000 terminals with 12-inch green phosphor screens and Dataroyal 150 cps dot matrix printer. An alternative printer is the economical MX80 from Epson.

The latter is supplied by Warburton Franki, which also distributes the SHUGART SA1000 Winchester fixed disks used in the system.

A number of Sandell

SD101 systems are operating at present, the company providing application programs which include general ledger, debtor, creditor, word handler, stock and payroll systems. Software suitable for doctors, estate agents and club managers are also available.

Datapoint Dispersed Processor

SIGMA DATA Corporation has announced the release of the Datapoint 1550 processor, an enhanced version of the 1500. Designed to function as a stand-alone small business computer, or as a component of a telecommunications network — or both — the 1500 offers the small businessman an attractive combination of state-of-the-art electronics along with Datapoint's manufacturing quality and professional service, at a base price of around \$8000.

The 1550 is available with either single or double-sided, double-density drives and can also support a Datapoint 10 Mbyte cartridge drive, and this system, with the addition of a four-port serial interface, can act as the central processor in a four user Datashare

timesharing business system. Either 32K, 64K or 96K of memory is supplied.

The 1550 supports Datapoint's DATABUS business programming language, as well as FORTRAN and BASICPLUS languages. Additionally, word processing and electronic message services can be performed by the 1550. In addition, the 1550 can also be used with CP/M.

For further information, contact: Sigma Data Corporation, 157 Walker Street, North Sydney, 2060. Phone (02) 922 3100.

Footnote: Datapoint was the company that enquired of Intel whether it would be possible to put some of the functions of its terminals onto a single chip. Intel said yes, and designed a chip that did more than Datapoint wanted — so it rejected the design, and Intel decided to market it commercially. The chip was the 8008, fore-runner of the 8080, and the first 8-bit microprocessor! The 1550, by the way, is based on a Zilog 'Z-80A.'





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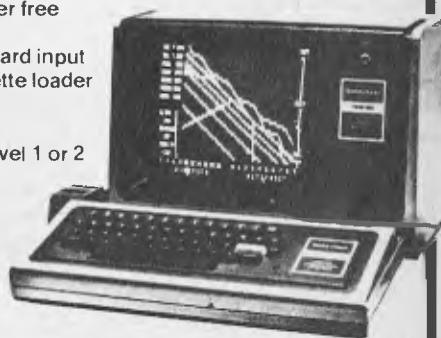
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YES, we are now fitting an additional 32K into the TRS-80 or SYSTEM 80 keyboard. Does not affect any function or operation. If you just want more memory, without disks without the expense of an interface, this is the ideal solution!

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Compiles selected subset to Z80 machine code in all four variable types, compact 1K run-time component controls interpreter to streamline all other statements and functions. Technique minimises code expansion without impairing huge speedups for true double optimisation. Six diagnostic messages. Local/Global options increase compatibility with subject programs. Output save to Disk, instructions for self-contained SYSTEM tape. Professionals note: No royalties on the derived code! ACCEL 2 brings your BASIC programs alive. It's like having a 100 mhz clock! \$99.00

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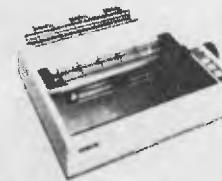
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OLYMPIA WHISPER DISK DAISYWHEEL TYPEWRITER/ TERMINAL

Disk Tariff Rocks Industry

A FEDERAL Government decision to impose a 35 per cent import tariff on computer storage diskettes is causing the computer industry's first major political confrontation.

The decision, which could have far-reaching effects such as a loss of jobs in the local re-selling industry, has caused local retailers and users to set about lobbying the Federal Government to drop the tax.

Already local retailers and manufacturers are being urged to contact their local members of Parliament to protest the tariff move.

The main point of concern is not so much the duty on the disks themselves, which usually retail for about \$5 to \$7 — it's the fact this tax is also being imposed on pre-recorded programs.

The tariff was imposed supposedly to protect the growing Australian disk manufacturing industry, which most retailers and computer lobbyists agree is worthwhile; however, passing the tax on to pre-recorded programs has meant an overnight price hike for these products.

According to Mr Peter Hatcher, of City Personal Computers the cost of computer games, for example, have increased dramatically.

"The duty went from two to 35 per cent overnight," he said. "This could kill the trade and a backlash from the consumer has already been seen."

"We don't know what the full effect will be, it's early days yet, but it doesn't bode well for the Australian computer industry."

"We got a shipment of games recently worth about \$800 and we were then hit with an import duty of about \$200, so we just had to bump up the prices."

Mr Hatcher says a great deal of technology could be lost to Australia if the 35 per cent tax remains. Importers

will be forced to drop certain lines of pre-recorded disks because they will be out of the average buyer's price range.

He says it could also lead to individuals importing their own programs from overseas thereby losing for the Government its source of tax revenue and destroying the retail trade in one hit.

A letter being sent by the computer lobbyists goes further; it suggests that the customs department may be trying too hard to collect revenue without regard to the effects on the community.

It also suggests that the customs department may be: "too lazy to find out whether its collection procedures are incorrect, relying on importers to either sue or scream."

The whole issue is likely to blow up in the next few weeks as the full effect of the duty is felt by more and more importers.

Whispers about further software taxes likely to be included in the Federal Budget are unlikely to bring any joy to the computer industry.

Meanwhile importers, retailers and users affected by the new tax are being urged to contact their local members of Parliament in an attempt to have the tax either reduced or repealed.

One of the groups selling and making disks in this country says the import duty has created jobs in Australia.

According to Warwick Downes, of Magnetic Media Services, the fact that pre-recorded programs have also been affected is "unfortunate".

"It doesn't make much difference to us," he says. "We are still paying the same price but we are now buying Australian made products instead of the overseas goods."

"The duty has created jobs in the Australian based industry."

"It's a bit unfair that this tax is now hitting the pre-programmed disks." □

California Computer Systems

Model 2210 Microcomputer System



- 2 or 4 MHz operation
- Z-80 CPU
- 65,536 bytes of dynamic RAM
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- Baud rates to 19200 baud
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- 12-slot mainframe
- Internal cabling installed
- CP/M 2.2 (on diskette) Operating System

The Model 2210 Computer System is a Z-80 based system containing 65,536 bytes of dynamic RAM memory and floppy disk controller mounted in a 12-slot mainframe. The system is ideally suited for applications where user defined peripheral devices are to be used and a high degree of system flexibility and expandability is desirable.

The system components are the Models 2810 CPU, 2065 64K Byte Memory Module, 2422 Floppy Disk Controller and 2200 Mainframe. Of the 12 slots available in the mainframe, only three are used for the basic system components. 9 slots are available for user options or other CCS products such as memory (expandable up to 512K bytes), serial and parallel I/O boards.

System software is provided using the CCS version of the CP/M Operating System, Version 2.2. The system is totally linked to permit auto-boot start-up with the CP/M on diskette.

Order Information

2210C Table Top System, 240 VAC/50 Hz, Cream

2210C System comprises:

2201A Mainframe	\$499
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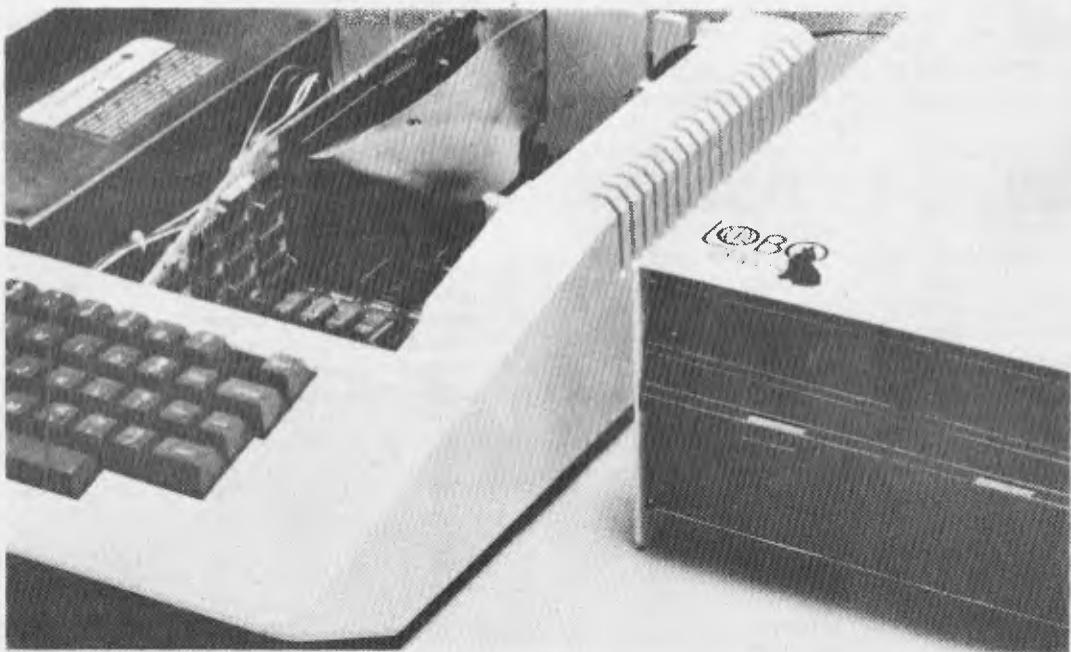
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Apple Action

IF EVER he has to find another job, Stephen C. Shank, Apple's international sales manager, should apply to Ringling Brothers circus. He'd be a surefire success as a tightrope walker.

He displayed this particular skill during his visit to Australia to promote the new Apple III and, more importantly, clear up any misunderstandings about who is the distributor of his company's products in Australia.

Dealers and consumers have had every right in recent months to scratch their heads in some what muddled contemplation of what is what.

After all, there's seemingly been a choice of three "sole" distributors. But silver-tongued, sure-footed Steve has set the record straight, so far as it is possible in circumstances brought about by Apple head office.

The brief history of the story is that in its early days Apple appointed a Hong Kong company to distribute Apples in Asia and Australia. The Australian distributorship was on a non-exclusive basis.

According to Mr Shank the Hong Kong company did not exercise its Australian rights until early this year when it appointed CGF Electronics in Melbourne as its master agent. This move followed Apple's appointment of Sydney-based Electronic Concepts as its "official" Australian distributor.

Mixed in with this scenario was the fact that Computerland had established itself by dint of high-

volume direct imports from Apple as some sort of unofficial master agent for Apple.

Putting on his resined shoes Stephen shank, ably supported by Rudi Hoess (Elcon) and Richard Graham (Computerland) called a meeting of the computer press to enjoy breakfast with him and listen to a clarification of the situation.

Mr Shanks really didn't say all that much other than that Apple would be much more effective in the Australian market by giving better support to the national distributor. "That's the only way we can succeed, he said.

Apple's assistance would include marketing and advertising support and dealer training in association with Elcon.

Rudi Hoess said he had already recruited 48 dealers in Australia and was supplying seven Computerland outlets. He anticipated tying in a lot more dealers. Mr Hoess said the dealers he was recruiting had to satisfy him of being capable of providing efficient after sales service to customers. He also said Elcon was moving about 350 Apples a month and predicted a rapid increase to about 700.

He announced, too, that his company was opening a four-storey warehouse in Wentworth Avenue, Sydney. Part of the space would be used as a training centre for Apple users.

Mr Richard Graham said that Computerland would double its outlets to 14 by the end of this year. His company would get

supplies from Elcon as well as importing direct from Apple.

Mr Shank than announced an extensive consumer television advertising campaign followed up by a business and trade press campaign. He said Apple would be supporting both Australian distributors.

Your Computer later phoned Mr Paul Marks, managing director of CGF Electronics, for his side of the story.

He said his Hong Kong supplier's contract with Apple had two years to run and that CGF would continue to distribute in Australia.

"We're now involved in a two-man race that will keep both of us on our toes. It can only be good for the industry," he said.

Mr Marks claimed his company had about 65 per cent of the market: "We're selling around 270 Apples a month. This will increase to 500 or so before long so I can't see Apple knocking us out when we're doing so well."

"We have 40 dealers and plan to increase this markedly. I also have the financial resources which put my company in a strong position and allows CGF to sell at lower markups than Elcon," he explained.

CGF would make stock available to Computerland at lower prices than they could import direct from Apple, he added.

Datapoint acquires Sigma Data

SIGMA DATA Corporation has announced its acquisition by Datapoint Corporation in exchange for an undisclosed amount.

Under the terms of the agreement, Datapoint acquired 90 percent of the shares of Sigma Data, while 10 percent of the shares remain with its previous Australian shareholders.

Sigma Data will change its name to Datapoint Corporation Pty. Ltd. The name change will take effect immediately.

"We see the acquisition as a positive move for all parties concerned," says Robert Kaye, managing director of the new Datapoint subsidiary. "Datapoint maintains one of the strongest research

and development teams in the industry and an integrated electronic office product line that far surpasses any similar competitive product offering. We feel that, coupled with our management, sales and support experience, Datapoint will continue to maintain its very strong position in the local marketplace."

The new Datapoint company will maintain its offices in Sydney, Canberra, Perth, Adelaide, Brisbane, and Melbourne; as well as Auckland and Wellington in New Zealand.

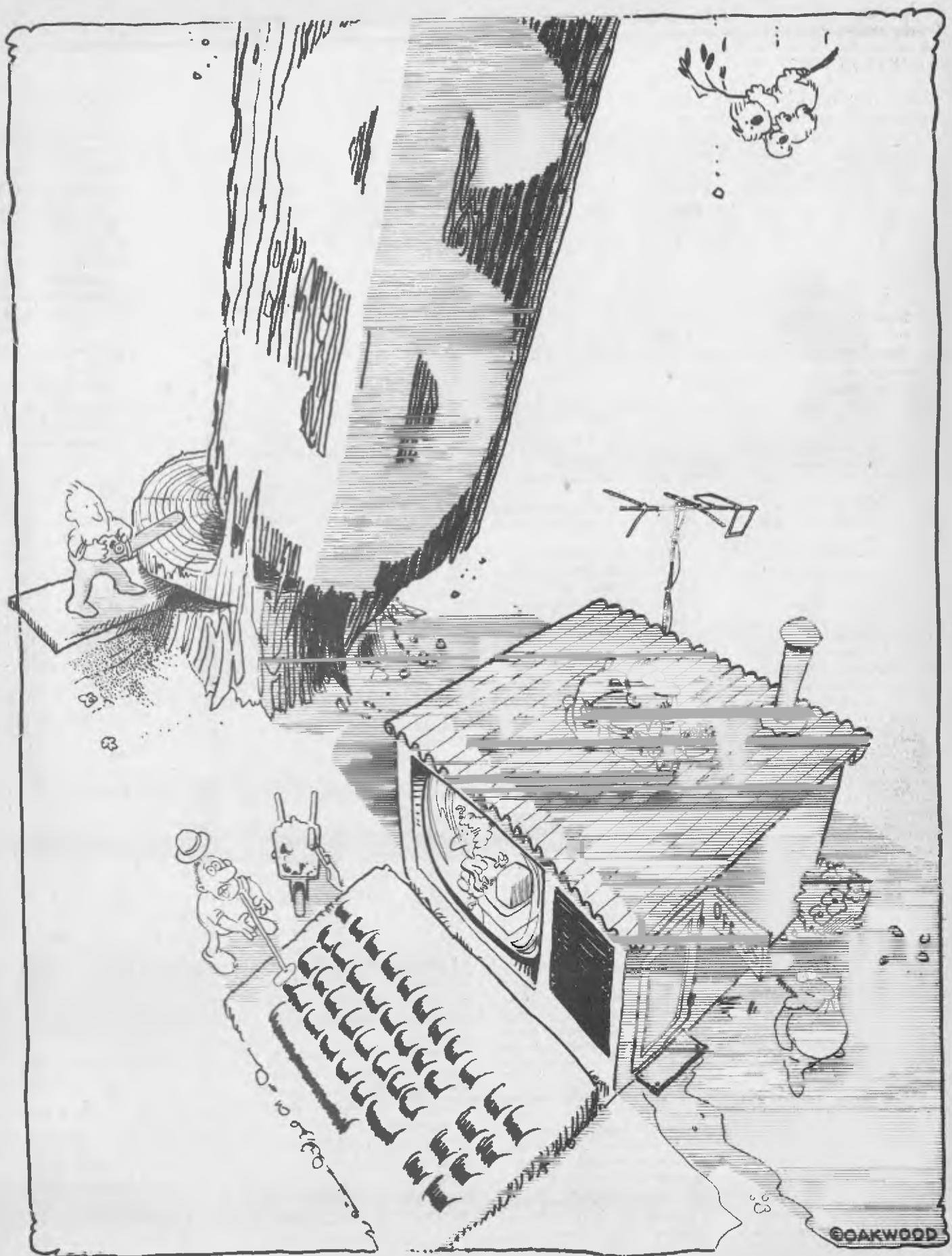
MP/M-86

DUE FOR release around now in the US is Digital Research's most ambitious product yet: the IAPX-86 version of MP/M. CP/M-86 has been around for some months now; it is basically the same as CP/M-80, which we all know and love, albeit with a different assembler and new version of DDT.

MP/M-86, however, bears very little relationship to MP/M-80 (or at least to version 1.1, which we all know and... well, we're learning to live with). MP/M-86 offers a number of features which remind one more than a little of UNIX...

For example: password protection, record and file locking, mutual exclusion of system resources. Queues are implemented through 'pipe' constructs, and the new system will have a 'flexible shell structure'. Another familiar feature is redirectable I/O.

MP/M-86 will occupy 20K of memory, and is statically relocatable in much the same way as CP/M. For those who like to think big, it will support 16 disk drives, each of up to 512 Mbytes. And Intel has given tacit recognition to the product by reserving software interrupt 254 for the exclusive use of CP/M-86 and MP/M-86.



HOME COMPUTING ON THE CHEAP

by TONY BLACKIE

HOME COMPUTERS are here; they're no longer a science fiction dream but a reality and Australia's retail industry is leaping in to meet the demand.

The demand has created a price tumble, putting some of the most sophisticated pieces of modern technology into the home for about the same price as a colour television set.

A computer terminal providing games, accounting facilities and a host of other marvels can be yours for less than \$500.

The Australian computer industry is now as competitive as any in the world and this is evidenced by price drops of up to \$400 on some lines of merchandise.

The computer industry is now involved in a price cutting exercise which is unlikely to end in the foreseeable future. Increasing demand, a higher volume of imports, an increase in Australian-produced components and "backstreet" dealers have all contributed to the current low cost of computers in Australia.

Prices of computers and components have been dropping at a rate of about five per cent each month. No longer is the computer the executive toy, it is now a practical and relatively cheap commodity within the financial grasp of most wage earners.

To the dealers it is a boom which, while expected, has gone beyond the magnitude of normal sales expansion. According to one dealer a man recently bought a computer and all the components he could lay his hands on with the money he had received from selling the family car.

"He was not a computer buff," the salesman said, "he just wanted to know everything about computers so he got the biggest".

But you don't have to sell the family jewels to buy a computer. You don't even have to hand over an arm and a leg to the finance companies on a loan. All it takes to get started is about \$250; only 12 months ago the same exercise would have cost about \$1600.

According to John Osbourne of APF Electronics the Australian computer market is now as competitive as any other. He says prices are now comparing favorably with the US market, probably the biggest in the world.

"I can think of things like calculators which could be bought cheaper in Hong Kong a few years ago... now they are

cheaper here. The same thing is happening with computers," Mr Osbourne said.

He says the back street sellers of computers have helped to drag the price of computers down within the reach of most Australians by creating a highly competitive industry.

And while the major dealers will never be able to sell their equipment at the low prices being offered on the backstreet market, the backstreeters will never be able to provide the service follow-up that is vital in computer marketing.

"I don't think prices will fall too much further on most ranges of computers, but what will happen is that they won't rise; relative to inflation the price will effectively drop," Mr Osbourne explained.

"When you consider that a full colour APF sells for about \$995 — down almost \$400 in 12 months — you can see how cheap the technology is.

"What is going to happen is that the home computer, which is the biggest growing market, will replace the colour television.

"Everyone will have a micro, providing TV games for the kids, accounts for dad and perhaps even a direct plug into the local supermarket for mum."

The fact that most schools are now teaching computer programming on a

basic level to students will also help to reduce prices, Mr Osbourne believes.

"When these kids who are now learning computers hit the market place there is going to be another boom," he said, "I know it sounds mercenary but it's just a fact of life, and it must drag prices down lower."

Because computers are relatively new in Australia there have been some teething problems. Retailers have experimented with imports, some they have found to be a waste of money and they have been thrown out; others have been successful and sold well.

But this experimentation has cost money and it's these costs which have held the prices up.

Now the market has stabilised. There are thousands of computer experts in Australia who know what they want and are not prepared to take anything but the best.

This has meant that mistakes in merchandising are less frequent and, as a result, overheads are reduced.

Peter Sandys of City Personal Computers stresses that people should not be frightened about the cost of computers.

He says the market is now competitive and this can be seen in the dramatic drop in the cost of components.

One such drop is in the cost of memory chips which 12 months ago retailed for \$112 but are now going for about \$30 and are likely to fall even further.

Computers such as the Commodore have dropped in price in the past 12 months from \$1799 to \$999 with a continuing downward spiral of about 10 percent a month predicted until rock bottom is reached.

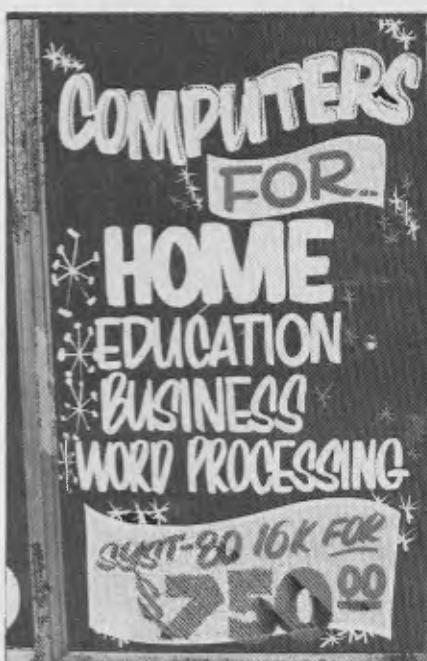
"Software has surprised us all and gone down dramatically in the past 12 months," Mr Sandys says.

"More and more people are buying computers for a hobby. I even know of a man who sold his car to buy an Apple."

When computers initially took off in Australia, importers were worried about how long the demand would last. They were concerned that the popularity of computers could wear off and they would be left with huge stocks of unwanted technology.

So they worked from month to month

Continued on page 24



Commodore is about to steal a march on its rivals in Australia with the release of a low-cost, high-technology colour computer. A combination of good features and an excellent price should stir up a lot of interest on the burgeoning home computer market — and open up the world of computing to a much bigger percentage of the population. Your Computer's PET columnist PETER SANDYS has had a look at Commodore's new baby; here's what he thinks:

The Commodore VIC 20

COMMODORE'S newest release should revolutionise the small computer market in the same way the PETs, TRS-80s and Apples have done in the past.

The VIC 20, a small but powerful colour machine, takes us another big step closer to the "every home should have one" ideal of personal computing.

Its low price — just \$399 without cassette but otherwise ready to go on your home PAL colour television set — and attractive features will open up the world of microcomputing to a wide range of newcomers.

The VIC 20 really is a low-cost personal computer.

Commodore feels that if it can keep it to

COMMODORE TAKES CHARGE



The Cost Cutters



this price it will appeal to a lot of people — that no one can argue against — and therefore sell in quantities big enough to justify a lower profit margin.

I first saw the VIC in what I would call the best testing ground available at a Commodore Users Group meeting, its first public showing locally. Instead of the expected Diehards' attitude ("it must be a toy...") the general reaction was quite favourable.

As I mentioned last issue, when I previewed its arrival, the name VIC stands for Video Interface Chip (an improvement on PET... Personal Electronic Transactor).

The unit itself is basically the size of the Model I TRS-80 keyboard, except it has the solid feel of the large Commodore keyboard (a feature which has always helped the Commodore stand out from other computers).

It is made of a white textured plastic similar to that of the Apple, and comes with an external power supply and RF modulator (to enable it to be linked directly into a PAL receiver).

The unit is light and, as the cost reflects, has fewer components than would be expected: this is because it has been built around the video interface chip designed by MOS Technology (a Commodore-controlled company). In fact the price is a direct result of the reduction in the number of components. Incidentally, the Australian version is being manufactured in Germany — normally bad news for prices but not now thanks to improving exchange rates.

It comes standard with 5K of memory which you can increase, with plug-in modules and an expansion unit, to 32K. The microprocessor is a fast 6502A unit; its extra speed is particularly evident in the screen display.

The demonstration programs, written in BASIC, behaved more like they had been written in machine code.

It has one quirk, however: it takes some time to activate its display after power-up. Commodore's Roger Davis felt this was related to its ability to relocate BASIC to suit the available RAM capacity. It starts with the standard Commodore format for describing the BASIC being used ***-CBM BASIC V2***), the number of bytes free (3583), a "READY" prompt and a flashing cursor.

The VIC is capable of producing both foreground and background colour. It can display 8 colours; white, red, cyan (a sort of sky blue), purple, green, dark blue, yellow and black, selected by pressing the

control key and the appropriate colour key.

In case you can't remember the colour codes, they are printed on the lower side of the relevant keys (1 to 8). It is possible to display all colours in a program.

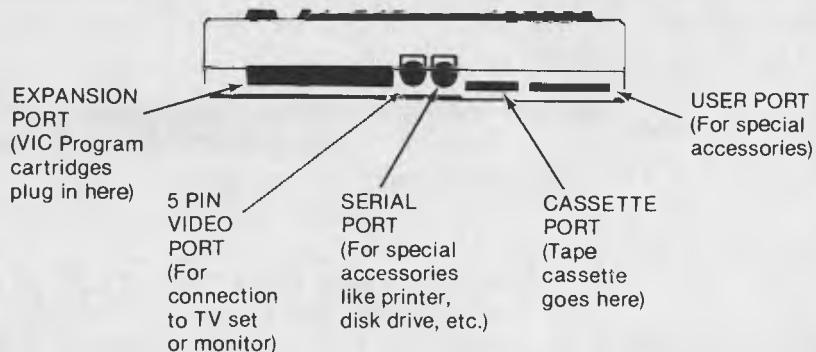
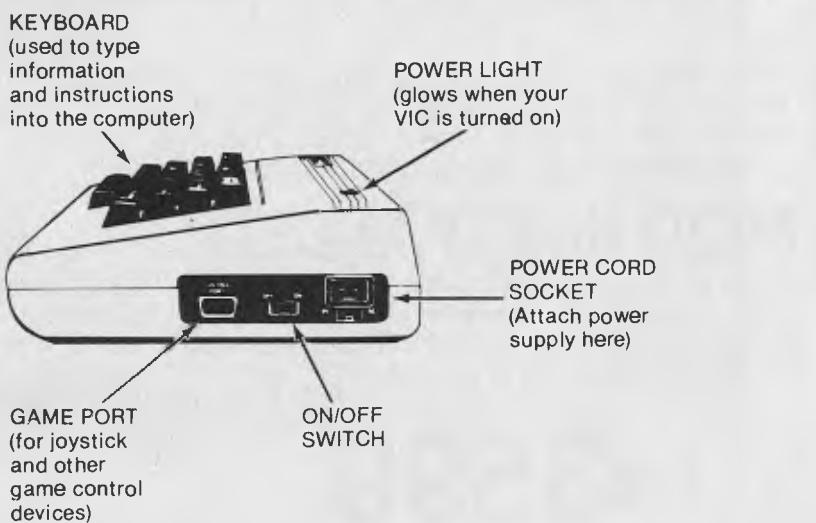
The actual working area available to you is a smaller screen set within a colour surround. On power-up this border is preset to cyan — fortunately the border can be selected by the user, with all 8 available.

Even the background colour of the working space can be changed, with more flexibility: there's a choice of 16 colours. The extras are orange, light orange, pink and lighter versions of cyan, purple, green, blue and yellow. Screen size format is 22 characters across and 23 lines down.

The small screen is a handicap, although this has not hindered the Sinclair ZX-80 which also has similar-sized display.

The VIC uses the same graphics characters available on the larger CBMs and PETs, but it can also display upper and lower case characters.

Hi-resolution graphics are also available, but this is an extra-cost option (in the form of a VIC Super Expander cartridge). With this cartridge the graphics resolution moves up to 176 by 176. Expansion to 32K is achieved by adding 8 and 16K cartridges through a master control board, which can also accept other program cartridges. One further cartridge provides a machine-language monitor and a number of utility functions.



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I am told there is an RS-232C interface cartridge available in the States which allows it to use a modem and hence have access to the source, which we in Australia can now hook up to through MIDAS.

Another goodie standard on the VIC is a three-sound register, covering a three-octave range each. These are labelled Alto, Soprano and Tenor — you can select which voice range you would like by poking a number into the relative location. There is a further sound register which enables you to set volume level by poking location 36878 with a value between 0 and 15.

The sound routines I heard were extremely good, much better than the old PET sound units and easy to program. In fact the manual to be supplied with the VIC has examples of various music routines. Page 73 gives the Poke value of any note you want and page 75 lists a program which enables you to play the Vic's keyboard like a piano.

The VIC has full BASIC available, compatible with all the version 4.0 commands except those which relate to the disk. It takes up to 16K of ROM. It has the screen editing keys such as CLR/HOME, INST/DEL and the cursor control keys, but naturally does not have the separate numeric keypad of the larger Commodores.

The manual is extremely well-written and easy to understand — it is a complete departure from the previous style of Commodore documentation. It was written by Avalanche Inc, which has also written two other books for the VIC: *Introduction to Computing... On the VIC* and *Introduction to Basic Programming... On the Vic*.



36874 . . . (alto)

36875 . . . (tenor)

36876 . . . (soprano)

Interestingly, they will be sold with a cartridge containing the longer example programs used.

I did find the "VICTIPs", which were interspersed through the manual, helpful even if the title was a little corny.

It is important for the manuals to be detailed as it will not be possible for dealers to give the same level of support expected when someone purchases a PET or an 80-column CBM — the dealer simply will not make enough out of the VIC to justify spending time with the buyer.

Other features of the VIC include its use of the standard PET cassette unit, the availability of a single disk drive, and a port which allows use of joysticks, paddles and light pen. Finally, it is able to run programs written for the PET (the only limitation is the difference in screen format). I believe the VIC will create a boom in the lower end of the personal computer market pioneered by the Sinclair ZX80. It is certainly cheap enough, and it has loads of ability.

You would be well advised to consider the VIC if you are in the market for a low-cost, good-value computer. It won't suit everybody but it certainly will make Commodore more of a household name in the future. . .

FOOTNOTE: a small warning to those who feel they will be able to save a few bucks on the VIC by purchasing it in the US — the local machine has a PAL interface built in, while US VICS work on the NTSC system and only produce black and white on our television sets. □

Command	Abbreviation	Looks like this on screen
AND	A SHIFT N	A
NOT	N SHIFT O	N
CLOSE	CL SHIFT O	CL
CLR	C SHIFT L	C
CMD	C SHIFT M	C
CONT	C SHIFT O	C
DATA	D SHIFT A	D
DEF	D SHIFT E	D
DIM	D SHIFT I	D
END	E SHIFT N	E
FOR	F SHIFT O	F
GET	G SHIFT E	G
GOSUB	GO SHIFT S	GO
GOTO	G SHIFT O	G
INPUT#	I SHIFT N	I
LET	L SHIFT E	L
LIST	L SHIFT I	L
LOAD	L SHIFT O	L
NEXT	N SHIFT E	N
OPEN	O SHIFT P	O
POKE	P SHIFT O	P
PRINT	? ?	? ?

Specifications and Report Card

Unit:	VIC 20
Made By:	Commodore
Processor:	6502A
Clock Speed:	1 MHz
RAM:	5 Kbytes standard
ROM:	8 Kbytes standard
I/O:	Games device port, Cassette, Serial, RS-232C
Languages:	Modified Microsoft BASIC
Keyboard:	Full-size qwerty layout
Display:	23 rows × 22 columns, PAL colour
Graphics:	High-resolution, defined graphics keys
Peripherals:	Cassette, disk-drive
Expansion:	By RAM packs to 32 Kbytes and by ROM packs
General:	8 colours (16 background), 3 music voices, volume control register, external power supply and RF modulator.



Continued from page 19

aiming to get their money back in as short a time as possible. This didn't leave much room for price-cutting, let alone healthy competition. Now the market is established they can drop their prices and take a risk, if there's a risk at all.

But the retailers, Peter Sandys explains, are still faced with some problems.

With the advances in computer technology, notably in Britain and the US, new and untried equipment is flooding onto the market. For the retailer the service backup costs are extremely high and those costs have to be off-loaded somewhere.

But as the Australian component manufacturing industry broadens these costs will be reduced. Instead of sending a computer to England or the US for repairs it can be done here.

Program piracy is also a problem in the industry because manufacturers are forced to get the product out and sold within six months. Failure to do this will mean that the pirates will have reproduced the program and have it out on the street.

Another reason for the low price of computers in Australia today is the discount retailer who is constantly undercutting the prices of the registered computer agent.

Some authorised agents are concerned that these dealers may give computer sales the stigma some used car dealers have produced for their trade.

They believe that while price cutting generally is healthy competition the lack of expertise and service back-up in the smaller operations will anger the con-

sumer who wants a real deal for his money.

But Peter Sandys says there is a very healthy sign in the industry and that is the boom buying by the home user.

"The home user generally knows what he or she wants and is prepared to pay for it," he says. "But also they are aware enough to know consumerism has its pit falls."

"Service backup, regardless of cost, is of paramount importance."

Magnetic Media Services manager Kevin Biggs, who deals mainly in disks, says the price drop has in his area reached its lowest ebb.

"Prices for items such as floppy disks are unlikely to drop much in the future;

when you consider they are already down to \$5 or \$4 it's obvious they can't go much further."

"But I can see the prices in the whole micro field dropping by half again in the foreseeable future. Once the manufacturers get the yields on the chips up economies will be passed on to the buyer."

He believes that the only disaster that could befall the computer industry in this country is oversupply.

"It's hard to see that happening, though," he says. "The producers are churning out computers as fast as they can and the world is just soaking them up."

A spokesman for Dick Smith Electronics agreed that there were discount deals in computers to be had but he pointed out that the lack of service back-up would affect the consumer in the long term.

He said prices had now reached what he considered to be rock bottom and that if a person was thinking of buying into computers now was the time.

"We are probably looking at some increase in customs quotas and taxes in the budget in August which may affect the prices slightly," he said.

"But technology is advancing much faster than costs so even if people are paying the same amount of money they are getting equipment which is far superior."

The fact that computers are cheap is now clear. For the beginner there are bargains to be had and the state of the market warrants customer investigation.

The prices for the most popular home computers do vary slightly between the major retailers and authorised agents, so it's worthwhile looking around for the best deal. This may not necessarily be the lowest price because factors such as service back-up cannot be stressed enough as a major buying point.

The ancient consumer's catch-cry Caveat Emptor, holds true in the computer world.

FALLING PRICES

Unit	July 1980	July 1981
Commodore PET	\$1799	\$999
Sinclair ZX80	\$299	\$199
System 80	\$750 (2 months ago)	\$695
Apple (48K)	\$1950	\$1600
Sorcerer	\$1395 (16K)	\$1395 (32K)
APF colour	\$1300	\$995
Micro Ace kits (ZX80 compatible)	\$199	\$189
16K upgrade pack (Dick Smith)	\$140	\$29.50
Memory chips	\$112	\$30

The prices for almost all these units can be up to \$100 lower in discount, mailorder or retail outlets. □

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Both Graphics 1 and 2 include point and line drawing features in machine code.

SUPER DISASSEMBLER

This is a very fast two pass disassembler written in machine code. It produces a Z-80 assembly language source file with labels that is directly compatible with the Sorcerer Development Pac.

The disassembler has a Displacement function which allows any program

residing anywhere in memory to be decoded, whether it is at its normal address or has been moved to be decoded.

The output can be sent to video, printer or cassette. The cassette file can be read into the Editor or Assembler of the Development Pac.
Several versions on tape at different memory locations. (N.B. Development Pac not necessary). \$21.95

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The most notable cost-cutter we've seen in recent times was Sinclair's ZX80 — the mighty mite from England. Now the ZX81 is here (or will be within weeks) with even more muscle packed into a tiny frame, and we've had one on test. BREF RUHL says it shapes up well, and will be a winner if the price is right...

More Fun with the '81

THERE IS, it seems, no stopping Britain's Sinclair Research. Since it released the ZX80 last year, more than 50,000 of the tiny computers have been sold — certainly a measure of its success.

Now comes the ZX81, the latest thoroughbred of the Sinclair stable, and its local release is imminent.

The first impression on seeing the ZX81 is that, if anything, it is slightly smaller than the ZX80, although the keyboard remains the same! It stands higher than the '80 and is wedge-shaped, rising toward the rear.

The machine is made of strong plastic

and finished in matt black. It is so light, yet so robust, you get the feeling you could drop it from waist height onto concrete without damaging it.

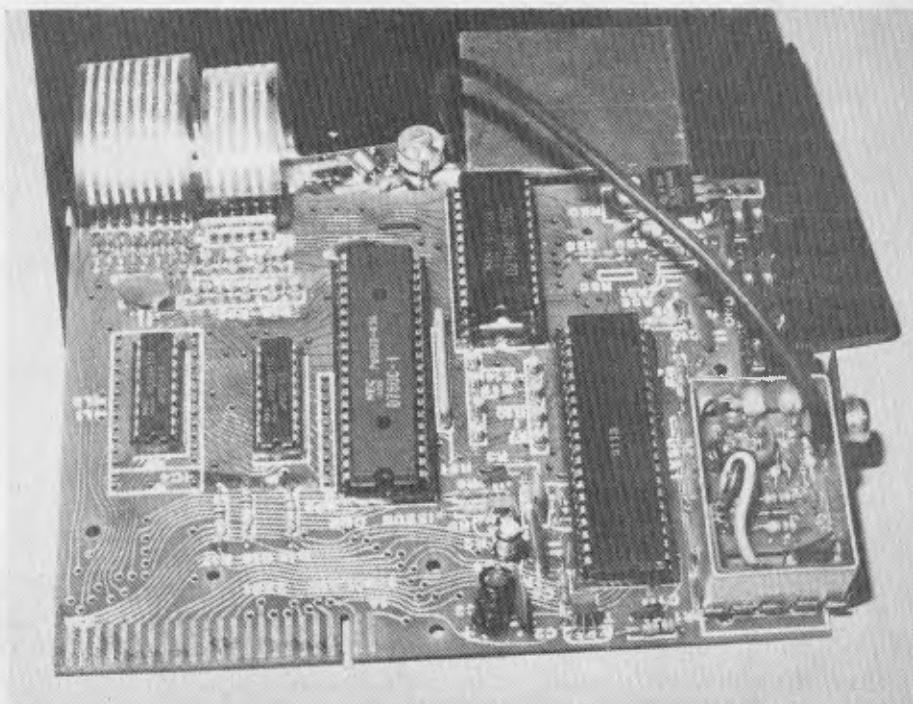
The most remarkable changes, however, are undercover, so to speak.

The Sinclair team has designed a chip that replaces fully 18 of the 22 chips on the ZX80. Thus we have a circuit board with only four chips, including 8K BASIC ROM (read only memory), 1K of RAM (random access memory), the famous Z80A microprocessor chip and, of course, the newly designed master chip. Other major items onboard are the RF modulator, voltage regulator, the cassette I/O sockets and the power input socket.

Initially the keyboard seems confusing, and it is. Most keys have up to five functions, but fear not, the manual explains it all very patiently. With practice it all becomes clear. The BASIC language, unlike the ZX80, supports floating point notation, a host of mathematical functions, and multi-dimensional string and numerical arrays.

In 'slow' mode the screen is memory mapped, and animated graphics are possible without resorting to machine code routines. In the 'fast' mode the screen blanks out each time a program is run, but executes four times faster! LPRINT and LLIST are the printer commands. COPY will affect a screen dump to printer.

The ZX81 retains single keyword entry and the line syntax checking features. The major drawbacks of this version of the BASIC language are the lack of user-defined functions and multi-statement lines. READ, DATA and RESTORE state-



ments are also not supported, but these can be bypassed by another feature not often seen; that is, when saving a program all variables existing in memory are also saved. So if you initialize an array with data which otherwise would reside in DATA statements, you can access this array in the same way.

These drawbacks notwithstanding, the ZX81 is a much more powerful computer than its predecessor. Probably the best news for many people is the fact that if they already own the ZX80, they will be able to buy the 8K ROM chip which will upgrade their machine. The upgraded ZX80 operates in virtually the same manner as the '81, except for the 'slow' command, which needs the extra logic contained in the ZX81 master chip.

As we said, the Sinclair now has print commands. The company is soon to release a printer to enable you to list out your reports and programs. It will be a 40-column thermal printer, containing the full alpha-numeric and graphics character set. Already on the market is the 16K RAM pack with which to expand the user memory.

There is no doubt the major contributory factor in this computer's success lies, in Britain at least, in the pricing of its various components. The ZX80 retails in the UK at \$A160, and the 16K RAM at \$A100.

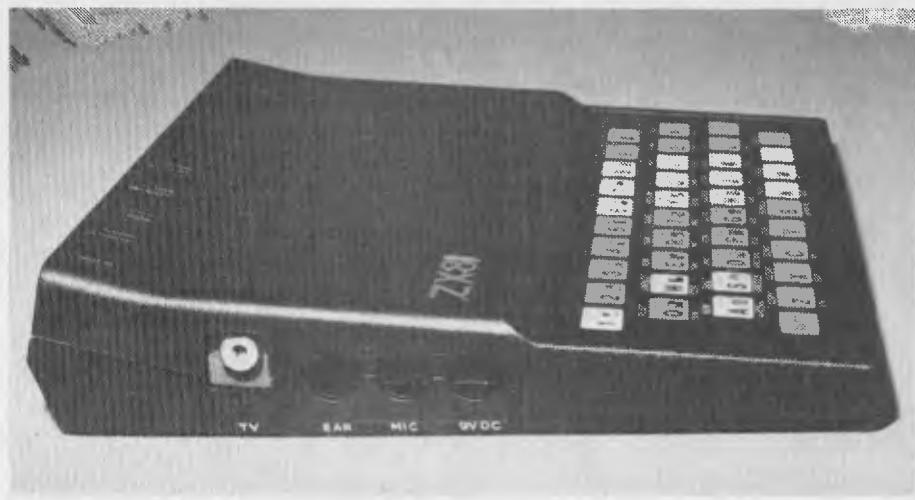
In Australia, however, the importers saw fit to offer the ZX80 at \$295, some 85 percent above the UK price. This price has now been slashed to \$199, due mainly to Dick Smith's Micro-Ace selling at \$189, we presume. Although the reduction could simply have been designed to bring the ZX80 price below the target price for the '81. However, the 16K RAM add-on price of \$150 is still 50 percent above the UK prices.

The ZX81 is expected to sell at around \$250 here — fully 80 percent higher. The printer, at around \$300, is a staggering 200 percent above the retail price in Europe of \$A100.

Frankly, we can't see any justification for price hikes of this magnitude. And if you look at machines like the Commodore VIC coming onto the market at \$399, it mightn't be long before the Sinclair importer is forced to put a realistic figure on the components.

It's a beautiful piece of engineering and research, however, and the ZX81 and its peripherals will no doubt have a significant impact on the Australian market. Several add-ons are being prepared which will greatly enhance this machine. A future issue of *Your Computer* will hopefully publish details and photographs of how to add a normal keyboard.

An interface is being developed to add a stringy-floppy mass storage drive, and rumour has it the ZX80/81 is actually capable of supporting 48K RAM... but more of that at a later date!



Specifications and Report Card

Unit:	Sinclair ZX81
Made By:	Sinclair Research, UK
Processor:	Z-80
Clock Speed:	N/A
RAM:	1 Kbytes onboard
ROM:	8 Kbytes
I/O:	Cassette
Languages:	BASIC
Keyboard:	Elastomeric QWERTY with shifted keywords
Display:	24 x 32 black on white
Graphics:	N/A
Peripherals:	Printer
Expansion:	16 Kbyte RAM-pack
Best Points:	Power/size, value-for-money (overseas, at least):
Worst Points:	That keyboard...

Ratings:	excellent	good	well, maybe	poor
Documentation	✓			
Ease of Use			✓	
Functionality		✓		
Support			✓	
Value-for-money		✓		
Extras included:	None			
Options:	Ram-pack, printer			
Price:	N/A (around \$200 in UK)			
Review unit from:	Graham Webber			

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ATARI-AT LAST!

Atari has finally launched its home computers on the Australian market after a lengthy wait for deliveries was compounded by a series of dock strikes. While the up-market 800 is out of the range, the baby 400 certainly fits the role of Cost-Cutter. By BREF RUHL

AFTER A YEAR of speculation the Atari has finally arrived in Australia. I received the Atari 800 and 400 a short while ago but by the time you read this the various computer outlets should have stocks — dock and transport unions permitting.

The Atari 800/400 comes neatly packed in a box containing the computer surrounded by polystyrene with a tray on top holding the various manuals, power supply and the BASIC ROM cartridge.

On first sight the 400 is perhaps slightly toyish looking with its plastic, pressure-sensitive type keyboard, but that belies the potential of having a powerful BASIC language, 10K operating ROM (Read Only Memory) and 16K RAM (Random Access Memory) as standard features.

The RAM is expandable to 32K by any authorized dealer — and, I suspect, to 48K before too long.

I approached the keyboard with some trepidation but soon found it quite respon-

The Cost Cutters



sive and easy to use. Each key has a slightly raised edge around it and the board emits a beep every time a key is pressed. The keys are arranged in QWERTY style and are well spaced for medium to small hands. Behind the key-



board is a hinged panel under which the cartridge is inserted. To the right of the keyboard are the Reset key and game control keys.

The 800 has a more business-like look to it, with a deeper, wider casing and normal typewriter keys. The Reset key is not only well removed from your normal finger range but has a raised plastic edge in front of it, thus protecting it from accidental depression. The hinged panel is also wider and covers two cartridge slots, I assume to allow for larger programs such as accounting or word-processing, which might occupy two cartridges. This panel is hinged to another larger panel, which when removed allows insertion of the 10K operating ROM Module and up to three 16K RAM modules.

Both computers have sockets in front to accommodate up to four joysticks or eight paddles for games control and other applications such as a lightpen. At the side is a recessed panel containing the power socket, power switch and a serial peripheral socket. The Atari uses a unique 'daisy chain' system which means that when you attach, say, a printer to the computer, the disk or tape unit plugs into the printer and so on. The major drawback of this system is that the extra circuitry needed to smarten up the peripherals adds to their cost, hence the \$114 price tag of a simple mono cassette recorder.

After unpacking the Atari I read the operators manual which gives very clear

instructions of how to connect the various items and I had no trouble at all getting a prompt on a coloured background on my TV. One interesting feature here is that the background colours are constantly changing so that, if left on for long periods, there's no chance of damaging the phosphor coating on your screen.

Inside the 800's "expansion chamber" is room for three 16 Kbyte RAM packs alongside the 10K ROM. The 800 can accept large cartridge-based programs with its twin cartridge slots. The reset key is protected from accidental knocks, while the Option, Select and Start keys below it are for easy operation of games.

instructions of how to connect the various items and I had no trouble at all getting a prompt on a coloured background on my TV. One interesting feature here is that the background colours are constantly changing so that, if left on for long periods, there's no chance of damaging the phosphor coating on your screen.

The BASIC ROM Cartridge inserted, I began to get familiar with the language. I had read elsewhere that there were limitations where array and string handling were concerned, and that indeed turns out to be true. Each string has to be dimensioned at the start of a program and string handling generally is minimal and cumbersome. Arrays are kept to only two dimensions and must be zeroed manually.

Another disappointment is that automatic line numbering is also absent and oh for the day someone adds line renumbering as a standard feature.

On the other hand, to make up for these deficiencies there are several areas where Atari BASIC shines. The full-screen editing facility is a programmer's dream. The cursor can be moved at will

anywhere on the screen and characters or lines deleted or inserted with ease. blanks can be left out during line input or more than one can be left after editing — do a list, and you'll see all lines correctly spaced and readable — though that of course puts paid to packing.

There are also a host of abbreviations besides the familiar ? for PRINT, these include C for COLOUR, D for DATA, LP for LPRINT; there are eighteen in all.

Other areas where this version of BASIC is very good, are sound and colour graphics manipulation. Sound is generated via the SOUND command which uses four variables to control the kind of noise you want to create: for example SOUND A,B,C,D, — where A = Voice 0 to 3 (up to four voices can be activated simultaneously) B = Pitch (any number between 0 and 255, which means 256 notes scaling four octaves) C = Distortion (any even number between 0 and 14 used for sound effects where 10 is a 'pure' tone and 12 a buzzer-like sound) and D = volume control (from 1 to 15). It's an easy to use command but very powerful in execution. Add a couple of loops and data statements and the combinations of sound are infinite.

Graphics are more complicated to master. Not least because there are 9 different graphic modes with up to 5 out of a total of 16 colours. The commands GRAPHICS, COLOR, DRAWTO, LOCATE, POSITION, PUT, PLOT, SETCOLOR and XIO



give you enough clout to put on the screen just about anything your heart desires. Resolution ranges from 20×10 pixels to a maximum of 320×192 pixels.

Using the SETCOLOR command you can set a colour's hue, thereby giving you access to not just 16 colours, but 128 colour-luminance combinations. XIO is a special command which lets you fill an area on the screen bounded by plotted points and lines. There is obviously a lot more to be said about colour and graphics programming on the Atari and this will be covered in later writings.

As was mentioned earlier, 8 paddles and 4 joysticks can be attached to the Atari. These are also catered for in Atari BASIC with the commands PADDLE, PTRIG, STICK and STRIG. (TRIG - trigger). Another unusual command is POP, which removes the loop variable from the GOSUB stack thus allowing exit from that loop.

Variable names can be any variation of capital letters and numerical digits up to 150 characters long, though the manual advises against using keywords as variables. A maximum of 128 variables can be used.

As can be expected from a computer system with such a propensity for sound colour and graphics, the real time game playing potential is tremendous and this is certainly illustrated by the two game cartridges I received with these systems. Basketball and Star Raider, the first a

The 'baby' Atari 400 is great value at \$599, but obviously doesn't have the same expandability as the 800. Single cartridge operation is its limit, although quite complex programs fit into one of the Atari cartridges. The plastic pressure-sensitive keyboard works surprisingly well.

superb 3-D game for up to four players, the other a real version of the famed Star Trek - the Hi-Res and sound effects as you go into Hyper-Warp have to be seen to be believed.

Futuretronics — the Atari distributor — is also bringing into the country vast amounts of software dealing with everything from games and educational subjects for the home, to business and management programs such as Visicalc and word processing.

Some of the educational software packages are of a brilliant audio/visual design, in which the cassette recorder is interactive with the resident program. Australian accounting software will no doubt appear in due course.

Due to the popularity of the Atari in the US it hasn't taken long for independent software developers to jump on the band-wagon. Microsoft BASIC and Pascal are well on the way to completion and Adventure International and Personal Software have also added Atari to their lists. An Editor/Assembler has just been released.

Hardware modifications are already arriving on the scene, including a 32K Module for the 800 called the 32K RAM-CRAM, which when used leaves one slot free in a 48K system and I would not be at all surprised to see an alternative peripherals interface module appear one of these days.

As has happened with Apple and TRS-80, local importers won't waste time in importing these items to Australia, especially the hardware mods, as, due to the unfortunate pricing of many of the Atari products, they will find a ready market here. The Atari 800, disk drive and cassette recorder are 77 per cent, 62 per cent and 86 per cent respectively above the US prices (a slight case of Tandy-ism?).

In summing up I would say that the Atari 800/400 is a first-class, state-of-the-art microcomputer destined to become a best seller.

At \$599 the 400 is particularly good value, with features which hitherto were available only on much more expensive micros. The 800 at \$1399 seems excessive but probably still worth buying for its expandability. I understand that for these first few months there might be a shortage of supply, so for all of you who might now be interested, I'd high-tail it to your nearest computer store and put one on order. In future articles I shall endeavour to cover programming capabilities in more detail and keep you up to date on the latest software and developments. □



LINTON-SIMPKINS

Frank Linton-Simpkins is the Sydney Morning Herald computer editor and a real veteran of the computer world.

WHEN I started in computing the concept of a personal or hobby computer was something for the science fiction writers to assume would appear in the twenty-fifth century with a resurrected Buck Rogers.

Australia had only Csirac, Siliac, Uticom and Snocom. Cirrus and Arctrurus were planned for introduction shortly. Then the first commercial computers began to arrive, the NCR-Eliot 405 at NCR's old York Street city office, the IBM 650 at that company's unfortunate address in the red-light area of Palmer Street, a Hollerith 1201 for Census and Statistics, a Burroughs desktop machine for Treasury and then, almost together, an IBM 650 for MLC and AMP.

It is significant that the Csirac, Siliac, Cirrus, Arctrurus and Snocom were locally made and all except Siliac were locally designed. One look at any of these machines, particularly Siliac would immediately throw all thoughts of home, personal or hobby computers from your mind.

Csirac was the first (in fact the fourth stored program, our sort) digital computer to be made in the world. It had some unique features like its input unit that used what amounted to a continuous punched card fed in endwise. It could be considered a 12-channel paper tape.

Csirac used, as did so many of the period's computers, technology developed for radar equipment. Its designer, the brilliant pioneer Dr Trevor Pearcey, is currently teaching at Caulfield Institute of Technology in Melbourne. CIT pioneered vocational uses in computing on the mainland in the very early 60s.

Despite the clever design Csirac occupies a rather large grey box about the size of three, three-drawer filing cabinets.

Siliac was a locally made modified copy of the University of Illinois' Illiac I, and the "AC" at the end of those early computer names meant Automatic Computer. Hence Univac for universal automatic computer.

Arctrurus was a computer incorporated into a desk-sized and shaped cabinet. It was pointing the way to the future in size reduction.

Shortly after Arctrurus came the DEC PDP-85 computer that could be carried around by one man and then the personal computer was only a matter of a few tech-

nological steps away from entering our lives.

There was only one thing needed to make the quantum jump, an impetus to develop microprocessors. This came about, although there are many people who dissent from my view, because the US defence forces knew they would eventually be involved in a war with North Vietnam.

They also had to plan to use their nation's technology to offset the on-the-job training that had been going on in Vietnam since the French invaded it for the second time late last century.

The main problem was that there wasn't much that a high-technology nation could find to bomb back to the stoneage. The one exception was the walls of the irrigation canals in the north. Just two metres thick, these walls were made of packed earth and even the best bombs had to hit them dead centre to do any good.

Many and justly famous are some of the military virtues of the US Defence Forces, but accurate bombing has not been included in these as many Australian ex-servicemen can attest.

The defence people needed a smart bomb that could hit those irrigation walls despite the aircrews. This implied that the bombs had to have on board small computers. There is nothing a defence person hates so much as having to offload explosives to make way for guidance mechanisms.

In response to the need, at least initially, to build small and reliable on-board computers the first micro-chips were developed.

It was discovered that in order to have any sort of acceptable rate of working chips the production lines had to be automated as much as possible and this, the makers found, meant that it was not much more expensive to make 5000 of these than it was to make 1000.

A need had to be discovered that could be filled by the extra chips and thus the current microprocessor industry really grew out of a military planning need to ruin the crops of North Vietnam.

Naturally that potted history of how your favourite little computer evolved was an oversimplified version of what actually transpired.

Man as physical maker of these devices missed out and there is some unemployment showing up even in the centre of this booming industry at Silicon Valley near Anahiem in California. Incidentally Disneyland is also at Anahiem.

Movements in the industry are violent

with new developments taking place almost daily. At the next level up from the chips and microprocessors, the changes and proliferation of assemblers has been frightening. There are some 15 in Australia alone and possibly 6000 in the US.

What this means is that the buyer of a current micro-based computer has an enormous choice and also will be offered excellent value.

So what am I on about, nothing much except to suggest that you view your new TRS-80, Commodore Pet or Apple II/III with the respect it deserves as the current peak of evolution.

The first computer is generally accepted to have been Eniac which was in use about 1946. It weighed about 20 tonnes, took hours to load a program, was partially programmed by adding via plug-board connections, cost \$6 million US in 1946 dollars and was rather slow.

A standard Apple II computer can be easily lifted by one man with its carrying handle, has about 32 times the storage capacity of Eniac and is more than 100 times faster. In addition, and this is most important, it costs around \$2000 with TV monitor and two "Joy Sticks".

The Commodore is similar with less ease of carrying because its shape is against it. Dick Smith offers a good machine for under \$600, there is Tandy TRS-80, the ZX80 for under \$200 and all are many times faster, more reliable and far easier to program than Eniac.

Within a few years at most and possibly months true hand-held computers will be available, although their use by anyone but the most dedicated computer man might be limited.

Computers always cause instant addiction and often lead to the alienation of wives, neglect of children and an urge to save the world from drudgery. Let me assure suffering families of computer addicts that while the disease is incurable there are periods of partial remission.

I will try to feed that addiction and also offer advice to families on how to cope with a man who is writing the ultimate compiler when he should be lighting the barbecue.

I will also tell of the odd people in the computer industry, the man who had a vasectomy in hope of success at a computer conference, the man whose wife caught him and a friend on the console of a computer investigating an in-put bound application, the time the airconditioning was put in upside down and other such snippets of culture.

Maxi

Benefits for Micro Users

An Open Letter to Computer Users
from Les Bell, Editor, Your Computer

Here's a great new concept to bring together the growing number of computer enthusiasts in Australia. Not only will the Mi-Computer Club introduce you to users of hardware and software identical to your own, it will also offer you the bulk buying discounts associated with a large group, as well as unique products not available elsewhere.

The trouble with most clubs is that they're run by a few dedicated part-time volunteers - the 'hard core' - who do all the work. There are only so many hours in the day, and they can't do everything they'd like to. Not so with the Mi-Computer Club - it's a professionally-run club, with the resources to meet your needs.

Check out the value - even if you don't take advantage of any of the offers, but just read the amazing newsletter, then you're \$16 ahead at least! And if the Mi-Computer Club can help you get better value from your computer, then that's money well spent.

The first 1,000 members will be known as Foundation Members and will receive extra discounts and priority on limited supply offers. So fill in the coupon and join today!

With Best Wishes,

Les Bell



A few of the many good reasons to join the Mi-Computer Club:

***Discounts:** On books, software, games, diskettes, cassettes, hardware, etc. You can even tell us what you want and we'll try to arrange it!

***Free Newsletter:** A monthly newsletter, full of news, information on club events, special offers!

***Free 1 year Subscription to 'Your Computer':** A \$24.00 value!

***Book Club:** All the latest and best computer science books to help you get the most from your computer.

***Interactive Membership:** We'll organise meetings, seminars and workshops.

***Problem Corner:** If you're having trouble with your system, or choosing the right peripheral, we may be able to help!

***Print Services:** Send the club your floppy disc and print specifications. You can have one copy or as many as you like - loose or in a binder.

***Future Benefits:** Further benefits are planned for once we're well established: for example, a computer **bulletin board** system, so you can send electronic mail!



Mi-Computer Club

Polk House, 55 Herbert Street, Artarmon NSW 2064 Ph. (02) 439 6355.

Please accept my application for membership in the **Mi-Computer Club**. I enclose \$20.00 for the first year's membership. I understand I'll receive my first Club Newsletter plus a Club Charter with my first subscription copy of 'Your Computer'. If I am among the first 1,000, I will be enrolled as a **Foundation Member** and receive the Foundation Member benefit sheet with my first newsletter.

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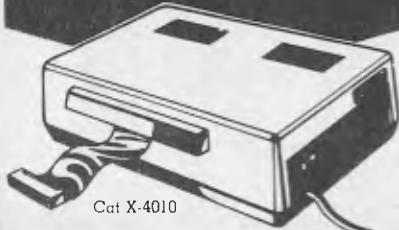
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Look at what 'BYTE' magazine thinks of the S-100:

Those who wish to have a machine capable of getting the maximum benefit of microprocessors, must go the S-100 route.

October 1979

S-100 RAM CARD

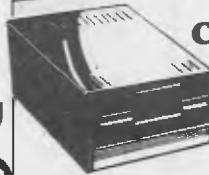
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The Tandy disk drive with 35 tracks gives 87.5K of storage and costs **\$699**. If you want approx. the same storage as the Dick Smith Micropolis™, you will need to spend **\$1378**. The Dick Smith Micropolis™ has 77 tracks with 2.5K per track giving a total of 192.5K of storage on one disk drive!

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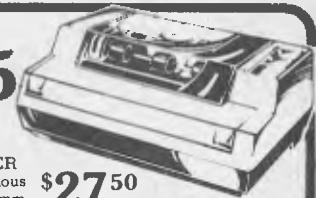
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\$1.95



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DAISY WHEEL PRINTER LESS THAN \$2000!



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\$1995

The quality of the Dick Smith Daisy Wheel printer shows in its ultra sharp, clean copy — so important for those special applications such as word processing. This printer accepts standard or continuous stationery up to 400mm wide. A large range of fonts is available, making it versatile as well as being a high speed printer. Centronics-type parallel interface, suitable for most available microcomputers.

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The **ATARI** is here now!

ATARI 400

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Both the ATARI 400 & ATARI 800 have these fantastic standard features.

- Full colour - connects to any TV (16 colours, 8 intensities).
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These easy to use friendly computers will have you enjoying them within 30 minutes of getting home. Or, these machines are capable of doing most microcomputing tasks plus some rather special and unique chips that give exciting and challenging possibilities to experts and amateurs alike.

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HEARD ON THE BUS

By LEON YENDOR

"Moving into Glass Houses after a life of Stone Throwing..."

I RECENTLY received the first copy of another Wayne Green rave-rag called Microcomputing Industry. It's free so I shouldn't complain as that makes it worth the price, and this time at least it made me ponder enough on guruism to write this page as a warning to myself and others who might be tempted.

Apart from Wayne's ever-present sermons on why some part of the industry is in trouble because they didn't have his almighty power to sway authority this issue gives us another chance to check out the guru supreme, Adam Osborne.

When reporting on hardware Dr Osborne did a reasonable job and apart from the inevitable few errors his books form a very solid base for an education in microcomputer fundamentals at the chip level. The problem is that somewhere along the way the good doctor had developed a penchant for preaching and prediction and neither of these is a science.

Worse still (for him) we haven't yet hit 1984 so he can't go back and rub out his past advice to buyers and must hope they forget it before they examine his new computer. How could any manufacturer, including Osborne, ever sell a new product if we all took his advice not to buy any product which has not been on the market for six months.

He also condemned the practice of advertising products not ready for shipping and yet had ads placed in magazines with cover dates May this year (published in the US in April) whilst at the National Computer Conference show in May his salespeople were quoting June deliveries.

Dear Adam, you have it backwards: pontification comes at the end of one's career. If you issue the stone tablets in your youth they may later fall on your own head.

Building Glass Houses

I have meant for some time to address myself to the problem of commercial software piracy. I don't pretend to have answers to how an author of software can protect his product but I do have a warning for those who seek to steal it for commercial gain and those who resell these dishonestly 'created' products.



The widespread practice of making a copy of a program for your mates may be illegal but you probably won't get caught. On the other hand we have here some idiots who think that their total lack of ability can be compensated for by minor mods to programs and the distance from the legitimate author. There is one outfit who even thinks that changing the name on a screen display and leaving the rest of the game alone gets around copyright. Maybe they even believe the rumour (false) that the original vendors are in liquidation and unable to prosecute.

Well, old buddies, the author still owns the copyright and he isn't getting royalties from the distributors anymore so he'd like to carve you up, and the people your original was legally made by are a little short of cash. They can take you to court any time or maybe they think you aren't worth the trip but I am still less concerned about the copyright breaches than the upchucking reaction caused by your presentation of these as your own work when it's so obviously stolen. I can tell that your hardware is your own design though: it's so amateurish no-one else would claim it. You'll probably make a million.

The guys who are copying CP/M (the Digital Research operating system) had better make a million because, along with some of the other successful software houses in the US, they are out to make examples of commercial pirates and that includes the ones who think of distance as protection.

These big suppliers have the money needed to finance effective enforcement of their rights and an inclination to collect

punitive damages as a means of making an example of offenders. Recent cases outside the US have proven very rewarding and we can expect to be on the itinerary in the near future. Don't say you weren't warned, the good old buccaneering days are over so keep your ears to the ground.

Less transparent houses

There is one development in software that threatens to solve a large proportion of piracy as it affects operating systems and language processors, and at the same time is another threat to established software houses marketing similar products. This is the low cost high quality product put out by people like Leor Zolman (of BDS C fame) who feels that the high price of much commercial software encourages theft.

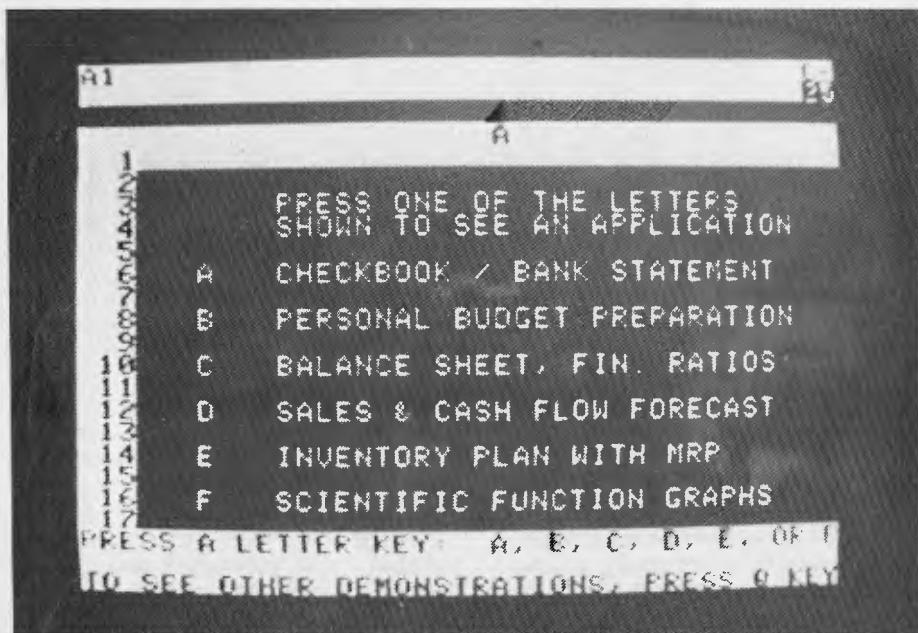
There is a growing band of these folk hoping that they'll get more sales than piracy at low prices and so end up getting a reasonable return in the end and maybe less ulcers too. Some have other motives like one guy, so upset by lack of support from the big guys he has decided to write his own compiler that works the way he thinks it should and sell it for a quarter of the price and thereby he'll have his revenge.

I'd love to write a compiler too but I've never been that angry. Maybe I should form a partnership with some of the local pirates. They would keep me angry all the time and see to the marketing too, and if anyone knows how to keep out other robbers they should.

**your computer
SOFTWARE
REVIEW**

No office should be without Personal Software's VisiCalc; there is probably no executive or small business owner involved in any sort of budgeting and forecasting who couldn't do the job better with it, says MATT WHELAN

Solve your Budgeting Blues



VisiCalc's demonstration program shows just some of the applications.

Below: An unusual use, but one that proves its versatility — a driver's log of a trip from Adelaide to Darwin, working out speed and consumption figures and so on. Data has to be entered in only four columns for it to calculate all this information.

SECTION	SECTION	ON-ROAD	ON-ROAD	FUEL	FUEL	TIME AT	SECTN	SECTION	CUMLTY	CUMLTV	O'ALL	CUMLTV	O'ALL	O'ALL	
		DISTANCE	TIME	AVERAGE	CONS	CONS	STOPS	DISTNC	AVERAGE	DISTNC	RDTIME	RDAVG	STOPS	TIME	AVERAGE
ADELAIDE	KM	HRS	KMH	MPG	LITRES/	HRS	KM	KMH	KM	HRS	KMH	HRS	KM/H	HRS	KMH
TO					100Km										
FT WAKFL	96	0.96	100												
FT PIRIE	132	1.00	132												
FTAGUSTA	83	0.58	143	22.60	12.50	0.25	311	111.47	311	2.54	122.44	0.25	2.79	111.47	
WOCMERA	180	1.47	122												
KINGDONY	171	1.70	101	22.10	12.78	0.17	351	104.28	662	5.71	115.94	0.45	6.16	107.54	
CBR PEDY	289	2.91	99	22.50	12.55	0.33	289	89.28	951	8.62	110.36	0.78	9.39	101.25	
MRLA BOR	299	2.92	102	22.10	12.78	0.66	299	83.52	1250	11.54	108.35	1.44	12.97	96.35	
KULGERA	198	1.92	103	22.00	12.84	0.66	198	76.86	1448	13.45	107.63	2.10	15.55	93.12	
A SPRING	286	1.80	159	19.90	14.19	1.58	286	84.62	1734	15.25	113.68	3.68	18.93	91.61	
TITREE	200	1.25	160	18.60	15.19	0.12	200	146.31	1934	16.50	117.19	3.79	20.30	95.29	
TENN CK	324	2.03	160												
TC SWAYS	26	0.22	120	19.20	14.71	0.17	350	144.99	2284	18.75	121.81	3.96	22.71	100.57	
DUNMARIA	339	2.17	156	19.60	14.41	0.25	339	140.26	2623	20.92	125.40	4.21	25.13	104.39	
KATHRINE	324	2.42	134	23.30	12.12	0.07	324	130.45	2947	23.33	126.30	4.28	27.61	106.73	
DARWIN	337	2.30	147	21.50	13.14		337	146.52	3284	25.63	128.11	4.28	29.91	109.79	



VISICALC IS a management tool extraordinaire — and if you're in business you probably need it.

There's no reason why you can't continue working things out with pencil, paper and calculator of course; you don't have to have VisiCalc. But now that I think about it, you don't have to have the calculator either — you can go back to the old way of pencil-on-paper arithmetic if you like.

It wasn't that long ago that personal calculators were a rarity, but I'll bet you couldn't live without one today. In a few years' time we'll all be saying that about our microcomputers, especially in the office situation.

Programs like VisiCalc seem to assure that scenario; VisiCalc's "electronic worksheet" is probably a bigger advance for the businessman than the calculator ever was!

You can construct just about any sort of financial model on its 63-column by 254-line worksheet, just as you would with pencil and paper. The VisiCalc sheet is larger than most — (one column can be set at anything from two characters wide to full screen) and it's smarter than any piece of paper you've ever worked with.

Labels, value entries and formulas can be placed anywhere on the sheet, and can reference any other point on the sheet, so any budget or planning format with some pattern to its entries (and there are few that don't have a pattern) is instantly made simpler.

But it's when you use VisiCalc properly, to construct models of these financial situations that its brilliance shows. You can then simply enter a single set of figures and let the program calculate the pre-defined flow-on from there. If we use the example of a budget (the program has a seemingly endless variety of applications, including complex engineering tasks) we can illustrate some of VisiCalc's capabilities:

You start, naturally, by labelling rows and columns with months and individual cost/income items, just as you would do with the paper worksheet, but there the similarity ends. From this point on you concentrate on the inter-relationship of your budget items, and set up a model that logically follows this relationship.

You'll find early in the piece that virtually every entry can be related to previous entries: for example, staff wages will usually

follow on from month to month with little change. On the VisiCalc work sheet you can chain them, by making each month's entry a statement that reflects the previous month's figure.

Add in an actual figure in the first column and the cross-referencing will spread that figure right across the page, giving you, for the moment, a repeating entry.

Wages likely to rise next month? Just type a new formula or figure at that position and, because the following months reference your current position, they'll change too.

If you've set the model up with similar chaining in all categories, or those where it is relevant, you could now fill your worksheet just by adding in a complete set of first-column figures. Of course life could never be so simple — you can't always have complete cross-referencing, and naturally you'll have to insert new or special values in their locations on the grid.

Then of course you'll want totals for costs and income at the bottom of each column, and a matching of these two to produce a profit figure. That's easy, as VisiCalc has inbuilt Sum and Average commands (among others), which allow you to reference the respective grid positions in each category.

You enter those formulas once in the first column, and again VisiCalc steps in to help. An inbuilt command allows you to transfer the same (relative to its own columns) formula to the matching position in each column.

Presto! all of a sudden you have a budget sheet full of figures, with additions, subtractions, divisions and multiplications performed wherever necessary. VisiCalc will have taken seconds to carry out a stream of calculations that would have kept you occupied for hours.

And that's just the start, because your cross-referenced model now allows you to play instant "What-if" calculations. If you change that wages figure in the first column and watch the screen, you'll immediately see a change in the matching figures across the rows; and in each column, a change in the totals and final profit figures as VisiCalc ripples its way through re-referencing and recalculating the entire sheet.

A few hours' work calculating an entirely new budget can be covered in a few seconds!

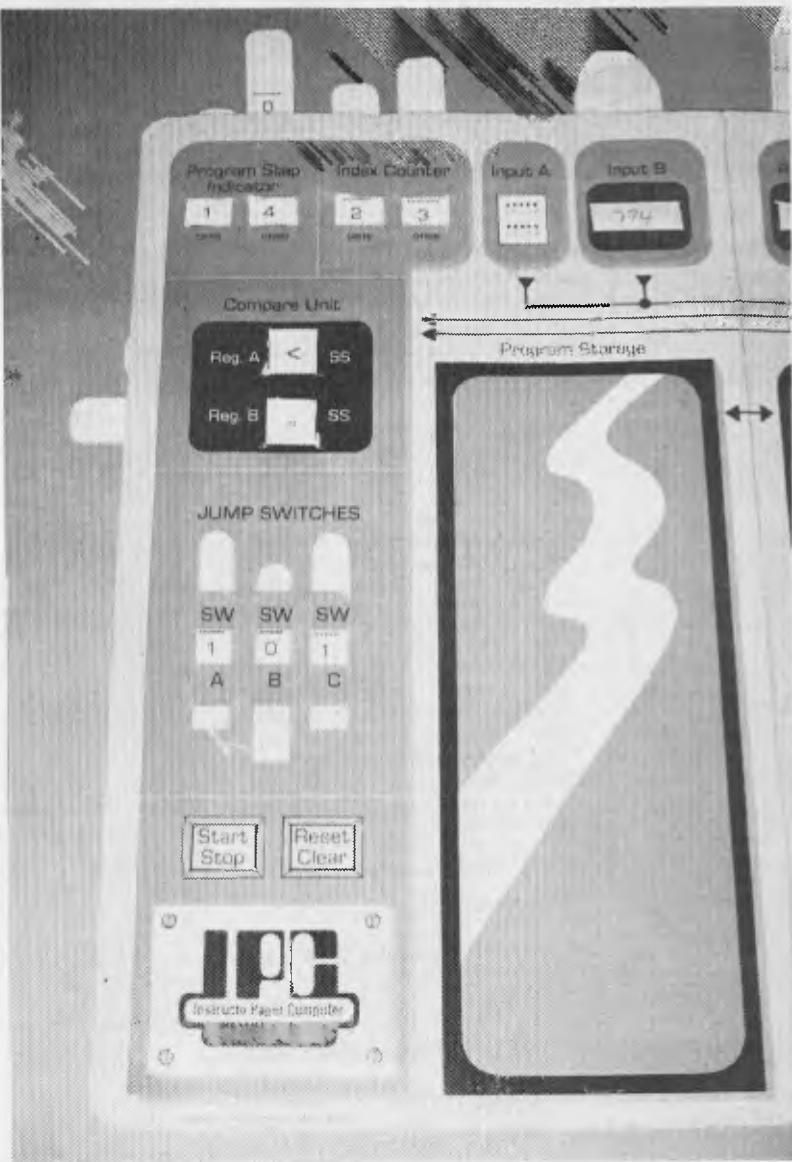
This versatility must promote better budgeting, and allow much better informed management decisions. The simplicity of doing a total revision, based on a change in value for one item, promotes the concept of searching through the alternatives for the best solution, rather than accepting the first workable alternative you stumble across in order to save yet another series of lengthy, dull recalculations. □

GORGEOUS GDN GNOMES MNTHL	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	AVERAGES
CAS GNOMES	1000.00	700.00	500.00	500.00	600.00	600.00	600.00	700.00	650.00
GNOME NANNYS	1000.00	1000.00	---	---	---	---	---	---	700.00
MODEL GNOMES	1000.00	1000.00	500.00	500.00	500.00	500.00	500.00	800.00	700.00
WARDROBE	650.00	600.00	550.00	550.00	550.00	550.00	600.00	600.00	581.25
ART DESIGN	700.00	700.00	700.00	700.00	700.00	750.00	750.00	750.00	718.75
HAIR SALON	700.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00	437.50
MAKEUP	500.00	300.00	200.00	200.00	300.00	300.00	400.00	400.00	325.00
PROMOTIONS	3500.00	1500.00	1000.00	500.00	500.00	500.00	500.00	500.00	1062.50
FRIDGE STOCK	12850.00	12850.00	16850.00	16850.00	18535.00	18535.00	18535.00	18535.00	16481.88
DIR COSTS TO	21900.00	19050.00	20700.00	20200.00	20400.00	22235.00	22485.00	22685.00	21206.88
AD PAGES	20	20	22	26	24	25	25	26	
AVG P. PAGE	349.06	379.91	379.91	379.91	379.91	379.91	429.75	429.75	
AD REVENUE	6981.25	7598.20	8358.02	9877.66	9117.84	9497.75	10743.85	11173.61	9168.52
LESS COMMISS	-69.81	-227.95	-417.90	-987.77	-911.78	-949.78	-1074.39	-1117.36	-719.59
NET REVENUE	6911.44	7370.25	7940.12	8889.89	8206.06	8547.98	9669.47	10056.25	8448.93
COVER PRICE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
RETURN PER C	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
PRINT RUN	30000	30000	30000	30000	30000	30000	30000	30000	
WASTAGE	2000	2000	1000	1000	1000	1000	1000	1000	
DISTRIBUTION	28000	28000	29000	29000	29000	29000	29000	29000	
ZSALES	60	60	65	60	65	68	68	70	64.50
SOLD	16800	16800	18850	17400	18850	19720	19720	20300	
WASTAGE	2000	2000	1000	500	500	500	500	500	
SOLD FRIENDS	0	0	0	500	500	500	500	500	
TOTAL SALE	16800	16800	18850	17900	19350	20220	20220	20800	18867.50
SALES INCOME	16632.00	16632.00	18661.50	17226.00	18661.50	19522.80	19522.80	20097.00	
SLS INC FRIE	0.00	0.00	0.00	250.00	250.00	250.00	250.00	250.00	
TDT SALES RE	16632.00	16632.00	18661.50	17476.00	18911.50	19772.80	19772.80	20347.00	18525.70
TOTAL REVENU	23543.44	24002.25	26601.62	26365.89	27117.56	2B320.78	29442.27	30403.25	26974.63

GROSS PR 1643.44 4952.25 5901.62 6165.89 6717.56 6085.78 6957.27 7718.25 5767.76

Software Report Card

Program:	Visicalc				
Made By:	Personal Software Inc, USA				
Useful For:	Financial management, forecasting				
Hardware Reqd:	Apple, TRS-80, Atari, Commodore etc. with disk drive				
Ratings:	excellent	good	well, maybe	poor	
Documentation		✓			
Ease of Use	✓				
Speed		✓			
Functionality	✓				
Support		✓			
Value-for-money	✓				
Extras included:	None				
Options:	None				
Price:	\$140 — \$200, depending on version				
Review copy from:	Seahorse Computers, Camden				



The REAL Paper Computer...

A paper computer? It sounds funny, but it's no joke. The Instructo Paper

Computer is a superb educational tool, as TONY BLACKIE discovered. He still can't believe he could so easily grasp the concepts of computing.

**your computer
REVIEW**

WHEN ASKED TO do a computer review I jumped at the chance. . . All those buttons to press, flashing lights and even the odd video game to play.

Seemed to me like a lot of fun and not too much hard work.

Having cleared away a space in the study for the review machine to stand, and on borrowing a friend's station wagon in which to carry this marvel of modern technology home, you can imagine my consternation and bewilderment when I was handed a manila envelope and told to get to work.

Had my review computer been squa-

shed during transport? If so would I be responsible for the damage?

With perspiration running in rivers from my brow and a shaky hand I opened up the envelope, (just to see what a squashed computer looks like, you understand); to my amazement I found the computer intact.

It was an Instructo Paper Computer, something they obviously felt was almost within my realm of understanding.

Surprisingly it is.

The Instructo Paper Computer is the first step in understanding the complexities of computer technology. Certainly it's a basic step but for those of us who are completely ignorant as to the programming and general operation of what is generally accepted to be the mode of the future, it is the best place to start.

The Instructo Paper Computer is the brainchild of Mr Fred Matt, a mathematics teacher in a US high school, and it's his belief that by necessity all people must become computer literate if they are to survive in the future.

The IPC has been designed to operate as an educational tool, to show the basic functions of a computer which can then be transferred for use on the real thing.

It is basically a large sheet of cardboard. Its face is that of a computer with stop-start buttons, jump switches, program storage, memory storage and several other components painted in.

To start operations small cardboard tags are placed in slots provided to give a modular design.

Amazingly this paper computer can do almost anything a large electronic computer can do — only with IPC you have to use a pencil and paper. But more of that later.

Having set up the IPC the next task is to work out the data flow, picturing in your mind the data busses, which in an electronic computer carry the messages instantaneously.

Down to work. . . The IPC has 100 program/storage locations listed from 00 to 99. The main storage unit is located on the left hand side of the IPC and each section is listed on a piece of paper which is clipped onto the cardboard background.

On the opposite page is the main storage unit. A quarto-size piece of paper is drawn up with 10 rectangular boxes numbered from 90 to 99. In these boxes you can pencil in the information to be stored.

So far so good.

The IPC has two inputs. Input A works like the zero to nine buttons on a small calculator, they don't actually work and that's where the pencil and paper come in handy. Input B operates like the magnetic tape reader of the real machines. With Input B the IPC user has to cut out a strip of paper which fits in the slots provided.

There are also two outputs, namely A and B, on the IPC which will provide solution to the program fed into the computer.

These, like Input B, are on strips of paper fitted into the slots on the cardboard face.

Confused? . . . It's only just begun.

With the cardboard cutout computer comes a clear and concise instruction manual. It provides a series of programs and a step by step operation guide.

So to the first program.

The following is the IPC operation Flow Chart.

1. Begin
2. Select a program and place it in the program storage section.
3. Push the clear/reset switch and —
 - a. Set program step indicator to 00
 - b. Set index counter to 00
 - c. Set registers A and B to 0
 - d. Set compare unit slides to =
 - e. Clear Outputs A and B,
4. Push Start/Stop switch
5. The number in the program step indicator shows a storage location: check the location for the program step stored there.
6. Using the Mnemonic list, do exactly what the program instruction list indicates. Then unless otherwise directed add one to the count in the program step indicator.
7. Was the computer directed to stop by a Stop, SS or by the Stop switch? If no return to step five; if yes some meaningful information should have been printed on one or both of the output tapes.

With that in hand the first program tackled is the most simple.

Taking the program provided, cutting it out of the operation manual and clipping it to the IPC on the space provided for Program Storage the whole mechanism of a computer begins to fall into place.

The program reads

00 LDRA 13
01 MULA 14
02 SUBA 15
03 JAZE 09
04 PROA 20
05 PROA 16
06 PROA 21
07 PROA 19
08 STOP 12
09 PROA 17
10 PROA 18
11 PROA 22
12 STOP 12
13 4
14 6
15 24
16 GOOFED
17 HELLO
18 I-M-A
19 AGAIN
20 YOU
21 TRY
22 COMPUTER

Through constant reference to the Mnemonic List the program takes shape.

Running through each instruction and writing up the result on the register tapes the solution to the program should read "HELLO IMA COMPUTER". If you fail and mix up the commands the result could be,

in true American style "YOU GOOFED TRY AGAIN".

And, believe it or not, I succeeded.

The simplicity of the paper computer comes clear after only 20 minutes of reading the manual and carefully following the steps which are laid out in plain English designed for the most basic of school lessons. The more complex the problem and program the easier it becomes to operate the IPC.

Not only that, but working on the basis described in the manual a trainee computer operator can make up his or her own programs. If only it had existed when I was at school it would have made that myriad of mathematical problems a great deal more simple.

In fact the IPC can be described as being an abacus which bends, simple but practical. Having the IPC under my belt

the next step will be to get that real computer and that space in my study won't go to waste.

The IPC is produced by Instructo/McGraw-Hill, the American publisher which has made education its livelihood. For schools it's a gem and is recommended for basic computer programming courses. For students it takes the mystic out of computer sciences, a most important factor. Students of tomorrow will be using computers constantly and it is important that they know not only how to operate them but also what makes them work and how they work.

The need for computer literacy cannot be stressed enough. Without it it's the machine which will dominate us. With it we have a practical means by which to advance the world into yet another revolution, both social and industrial. □

Specifications and Report Card

Unit:	Instructo Paper Computer			
Made By:	McGraw Hill			
Processor:	You-81 multi-tasking			
Clock Speed:	60sec/min			
RAM:	Unlimited if you can afford the paper			
ROM:	About 10 pages			
I/O:	Manual			
Languages:	VBASIC (very), English			
Keyboard:	Bic high-pressure stylus type			
Graphics:	Directly related to your artistic skill			
Peripherals:	Notepad, photostat machine (optional) for backup			
Expansion:	Folds out to twice its original size			
Best points:	Educational, comprehensible, sensible			
Worst points:	Educational, comprehensible, sensible — which means you have to do the work. . .			
Ratings:	excellent	good	well, maybe	poor
Documentation	✓			
Ease of Use	✓			
Functionality	✓			
Support	✓			
Value-for-money	✓			
Extras included:	Genuine errata sheet			
Options:	Pen, pencil, ruler, paper			
Price:	\$8.95 (or \$3.90 each in packs of 5)			
Review unit from:	Computer Galerie, North Sydney.			

CASE HISTORY

Every now and then a reporter gets the real inside story but for reasons of libel or other considerations can't put the information to print. This was not the case when FRED SYMES called on Norman Jew, managing director of Telmak Pty Ltd in Lane Cove, Sydney. In fact, Fred almost got more of the inside story than his stomach could handle, but in the interests of our readers he soldiered on bravely to bring you the details.

A tiger for punishment he then went to Pymble to interview Michael Meredith who destroyed what little brain Fred has with mathematical formulae. The result of both these calls will hopefully reveal how microcomputers can benefit small businesses.

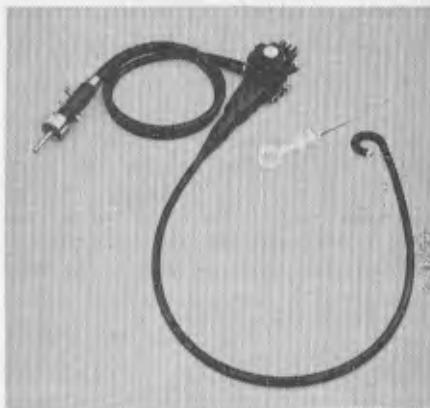
YOU'VE probably seen the odd television medical documentary in which physicians explore the patient's insides before making a decision to operate. Not the most pleasant of sights, but it's a technological advance which has resulted in more accurate diagnoses and elimination of unnecessary surgery.

The piece of equipment that makes it possible for the doctor to explore your insides is called an endoscope and in four years Norman Jew's company has become Australia's major supplier of them.

Known in the medical field as fibre optic endoscopes these thin, black light tubes with a tiny lens at the very flexible tip are inserted down the patient's throat into the stomach.

The lens provides a 105 degree field of view and a depth of field from 2 to 120 mm. The tip of the tube can bend upwards 210 degrees and 90 degrees right or left. In case you're interested, this bending capability and wide angle field of view allows close range frontal observation of the esophago-gastric junction, gastric angle and pyloric (look it up yourself) region.

A special movie camera can be fitted to the viewing end of the scope so that



specialists can later inspect the revelations at their leisure. Whether the patient would like a print to show at a home movie night really hasn't been considered.

There are many other models of endoscopes which allow exploration of just about every internal cavity and organ of the body but as you might just have had dinner we won't go into the details.

Telmak imports its scopes from the Fuji company in Japan which has a small shareholding in Mr Jew's company. Apart from these specialised medical instruments Telmak also market's Fuji's broadcast and closed-circuit television lenses, binoculars and many other optical items.

As well, accessories come from Belgium, West Germany, France and the United States. In all Telmak handles about 2000 stock items which are sold in Australia, Papua New Guinea, Fiji and the Solomon Islands.

With so many stock items and so many currencies Norman Jew was becoming snowed under with manual calculations as he endeavoured to update stock and price lists. So he got himself a Commodore Pet series 8000 and a Visicalc program and immediately cleaned up the mess.

Currency valuations in the program can be changed as they occur so that an accurate price list is always at hand at the touch of a key.

Mr Jew has to make frequent visits to Japan for meetings with Fuji. Between trips he jots down questions he wants answered, items for negotiation and observations he wishes to make at his next meeting.

Each of these items has a code and

shortly before he leaves Sydney he gets a printout of his jottings. Copies are sent ahead to the Fuji executives so they have a chance to consider the points, thus saving a great deal of time at meetings. As decisions on each point are made Mr Jew notes these on his master copy printout. On his return to Sydney this information (question and answer) is transferred to the word processor and the resultant printout is distributed to Telmak executives for action.

Other uses of the Pet are to provide a continuous update of spare parts. Next in line is full invoicing and stock control.

And now for the brain addling piece.

MICHAEL MEREDITH used to work out horrors like the formula over the page with his only assistance being a book of tables. Now Visicalc does it for him in minutes.

Michael is a one-man band who represents, in NSW, a number of American and Japanese manufacturers of industrial instruments and electrical valve controls. His job is, given a set of circumstances by a customer, to calculate the requirements and provide a technical quotation.

"Some of these calculations are so time-consuming when done manually," explained Mr Meredith, "that I had to restrict my quotes to tenders which I was almost certain of winning. This situation was a restriction on my ability to expand my business."

"Sure, I could have employed someone to help me but I could not foresee the extra turnover to justify such a move. I work from home, something I couldn't efficiently do if I employed staff."

Another of Mr Meredith's problems arose after he had completed his calculations. He had the hassle of getting his quote typed accurately. I believed him when he explained that the information was so technical most typists had to type, retype and then retype again before getting everything right. This often took two days or more.

Late last year he decided that a microcomputer was the only answer, with a word processor for printing quotes as a prime ingredient. His early efforts at purchase weren't the happiest of experiences. One salesman tried to upsell him outrageously, demanded a bank cheque and then walked off to discuss an even dearer piece of hardware with another customer.

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Why are our diskettes the industry standard?

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3M Australia Pty. Ltd.

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Darwin, 81-5645; Townsville, 72-3735
Brisbane, 391-7844; Newcastle, 2-5461

ANOTHER CASE FOR SCOTCH BRAND DATA RECORDING PRODUCTS

3M

Mr Meredith then got in touch with Direct Computer Sales and next thing he had an Apple II Plus with disk drive and parallel TEC 25FP printer delivered to his Pymble home.

He immediately set about putting it together — soldering the lot — and had his first printed document by 1 am. So pleased was he with himself that he woke his wife to show her what he'd done. "She wasn't all that impressed," he recalls.

The software he bought to go with the 48K Apple was the Zofarry Cash Book, Computer Solutions Wordmaster and Visicalc. The total cost was well under \$6000.

Within a week of installing his system he was using it effectively for quotes. Since March 25, when he got the thing working, Michael has doubled his turnover and "made my business a viable one."

He is now able to quote on jobs he would not have considered touching pre-Apple. More importantly, he is winning many of the tenders. By using Visicalc he can provide a verbal quote in a short time and have it on paper and in an envelope ready for mailing within 45 minutes. Compare that with the days it used to take. No wonder he's grinning like the cat that got the canary.

He also uses his system to address envelopes, print invoices and purchase orders. He has developed his own sophisticated glossary index and each Friday spends 15 minutes to produce a profit-loss balance. Three days after the end of the financial year he had his annual ba-

lance. "Usually my accountant is pleading with me in December for all the paper work," he said.

"Above all," Michael concluded, "I can now quote more professionally, more accurately and more successfully." □

STEM FACTOR EQUATION FOR CONVERTING THRUST(LBS.FORCE) TO TORQUE LB.FT

$$D((.96815 \times \tan\theta) + M)$$

F.S. -----
 $24 (.96815 - (M \times \tan\theta))$

WHERE

LEAD

$$\tan\theta = \frac{PI \times D}{X \times D}$$

D = DIA. - .5PITCH

SINGLE START THREADS TYPICAL STEM FACTORS
STEM DETAILS INCHES

'M'	O.D.	LEAD	'D'	'TAN\theta'	F.S.
0.20	0.75	0.25	.625	.1273	.0089
0.20	1.00	0.25	.875	.0909	.0111
0.20	1.25	0.25	1.125	.0707	.0132
0.20	1.50	0.25	1.375	.0579	.0153
0.20	1.75	0.25	1.625	.0490	.0175
0.20	2.00	0.25	1.875	.0424	.0196
0.20	2.25	0.25	2.125	.0374	.0218

MICROCOMP and COMMODORE

We at B.S. MICROCOMP, firmly believe in the capability and reliability of the COMMODORE range of Microcomputers. So much so, that with every system we offer a ONE YEARS STANDARD WARRANTY instead of the usual 90 days. Our installations cover hobbyists, education, technical, commercial and communications. Our customers range from home users, small business, schools, Government Departments to large corporations. We are Commodore's leading OEM Dealers in Melbourne and offer full Hardware and software support to all our customers. Whatever your proposed computer application, please seek our advice.



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The Commodore 4016 16K is still only \$999.00. A fully integrated unit, including built-in 40 e 25 VDU, typewriter style keyboard, separate numeric pad, 2 cassette ports, 1 I/O port and 1 IEEE-488 port. Where else can you get such value? Hurry now, offer only lasts while stocks remain available.

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MICROCOMP has distributorships for a large range of Commodore accessories — HIGH-RESOLUTION GRAPHICS, PROGRAMMERS TOOLKITS, RS232 TEST SETS — and much more. don't forget we stock a larger range of computer books and the famous PRINTOUT Magazine — a Commodore dedicated publication. call for further details.



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They say words are cheap. Word processors are not cheap. Our software for the Apple II is something else.

USING THE NEW TECHNOLOGY

The new technology of microcomputers can save you money without sacrificing quality. There's no longer any need to spend ten or twenty thousand dollars to get word processing in your office. Now you can get an Apple II microcomputer system, team it up with Computer Solutions' Word Processor software — and you will get real power in the organisation of your correspondence.

HOW MUCH WILL IT COST?

Our software has a recommended retail price of \$295 — yes \$295.00.

The hardware will cost a bit more. Between \$4000 and \$8000 depending on what kind of printer you require. An Apple II with 48K and a disk drive and a video monitor will cost you about \$3000. About another \$400 for a plug-in accessory to give you an 80-column display (optional). About \$1000 for the cheapest dot-matrix printer, or more than \$4000 for the very best letter-quality printer.

The most difficult decision will be which printer to buy. That's your decision.

THE EASIEST DECISION

The easiest decision will be which software to buy. Ours.

Do some comparison shopping. Visit your Apple dealer. We really want you to compare our software with the others. You'll find that ours makes sense to typists. Your secretarial staff won't get headaches.

We'd like to point out that you can save \$200 by buying El Cheapo software. But only a computer genius will feel at home with it! It might have features almost as good as ours, but what use is that if your staff can't use it?

NOT QUITE A STANDARD APPLE

When we designed this software we had to work our way around one serious deficiency of the Apple. Its shift-key doesn't behave like the one on an ordinary typewriter. We've designed a little modification. Your Apple dealer can change your Apple for between \$10 and \$20.

WHAT FEATURES?

1. Human engineering — designed for the user, not just for computer experts. Commands are easy to remember. No "mode" switching. Menus for disk access and Printing. Users can produce quickly, and become proficient in just a few sessions.

2. Full upper and lower case, controlled the way typists expect — the shift key shifts, CTRL shift locks, shift (again) unlocks. Gives audible feedback of lock and unlock. All ASCII characters are available.
3. The same program may be used for 40 column Apples (using HIRES, with on-screen underlining), or with the Smarterm, Videx or Doublevision 80 column boards; also works especially well with the new Vision-80 card from Vista.
4. Fast disk access using standard 3.3 text files; can access text files written by other programs.
5. A GLOSSARY feature! for fast entry of frequently used phrases or printer control sequences. e.g. CTRL - GS can be defined to enter "Sincerely yours," several blank lines, and your name.
6. Easy formatting to a variety of printers - width, margins, hanging indent, justification, microjustification (with certain letter quality printers), output of any escape or control sequence the printer needs, single or continuous paper, multiple copies.
7. Full mail-merge facilities for form letters, insertion of common entries (e.g. name, address, contract price, etc.)

WHAT'S IT CALLED?

Currently it's sold at ComputerLand stores under the name "WordMaster II" and at other Apple dealers under the name "CS Word Processor". Soon to be renamed "PEN-ultimate".

FINALLY...

If one of your disks becomes damaged (e.g. coffee spills...) return the disk to us with \$15 for an immediate replacement.

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A Vector computer has a good memory for detail, allowing day to day information to be stored. Vital information which could affect your business.

Other duties include working out an annual budget . . . previous period comparisons . . . projections . . . pricing strategies . . . financial planning . . . estimating . . . Tax returns.

A Vector computer can handle all your correspondence. Keep tabs on your inventory. Tell you how much your debtors owe you. How much you owe your creditors.

A Vector computer can expand when your business expands. You can start off with as little as 630,000 characters of storage and expand up to 128 million characters. For a purchased price less than \$5,000.00 or a leasing payment starting at \$30.00 per week,

You can't afford to be without a Vector Economy Sized Computer.

VECTOR

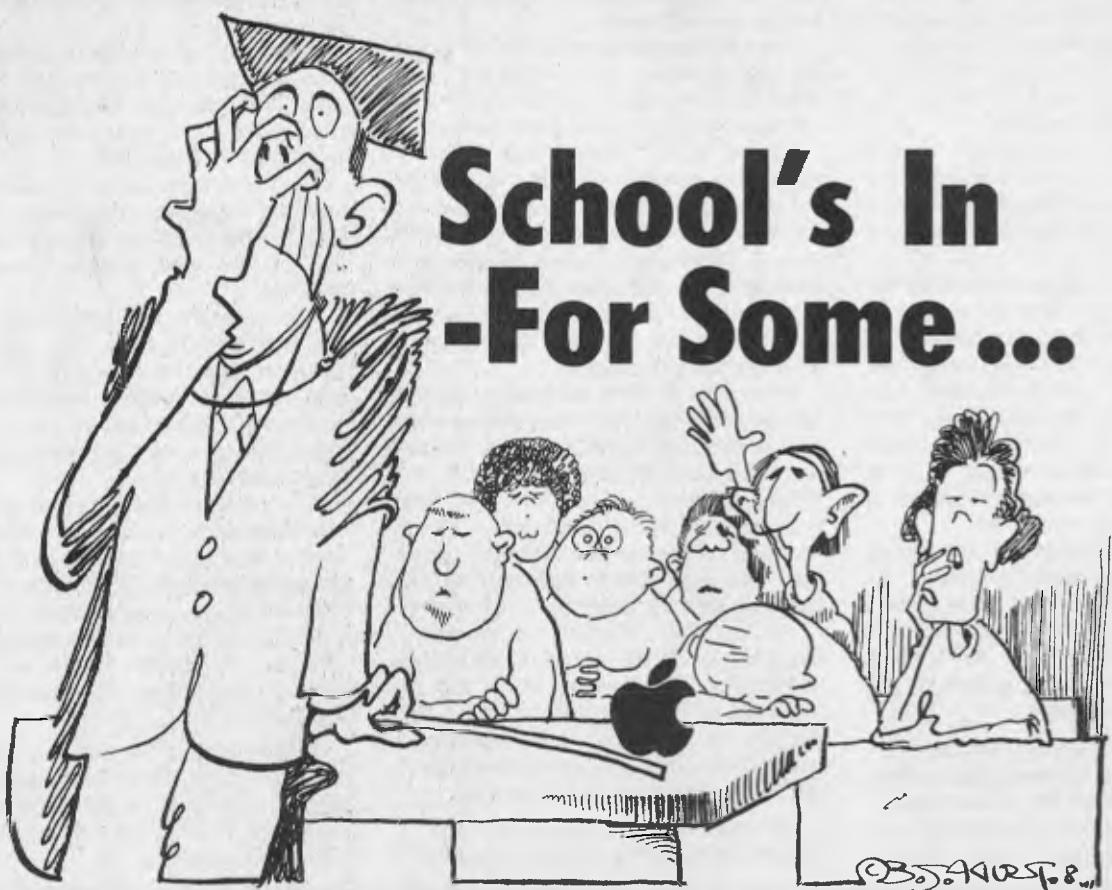
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School's In -For Some ...

by TONY BLACKIE

DESPITE THE impact computers, and especially home computers, are making in Australia, there are still few places offering comprehensive beginners' instruction courses.

It seems that educational institutions are geared up for commercial users, people intent on making a living out of computers, but as yet they have failed to recognise the need within the community to educate the hobby user.

The need for computer literacy has been stressed heavily in *Your Computer*, but our investigations have found that the demand is not being fully met.

Certainly the schools are recognising the need to educate students in computer technology but there are thousands of Australians who left school before computers were anything more than a remote thought, who are completely ignorant as to their operation.

The demand for courses of a basic nature for the hobby or home user is undeniable as registrars at colleges and universities will attest.

Retailers of the home computer say that within the next decade, based on present selling trends, one in four homes will have a terminal. And as more and more aspects of everyday life are handed over to com-

puters the need for knowledge becomes more important.

Trying to find a course in basic computer operation and programming is not easy.

Few of the Universities or Colleges of Advanced Education have anything for the raw beginner except their full time degree courses which are heavy going and obviously not for the home user.

The business colleges and correspondence schools do provide programming courses but here again they are usually for those people involved in the computer industry.

The best course appears to be the one offered by technical colleges which is aimed at people who have never seen, let alone used, a computer before.

The course — called Data Processing Concepts — is an 18-week (or 12 months) part time program. According to the Sydney Technical College the course is free of charge for all Australian residents and booking has been heavy.

The courses begin in February and bookings are being taken already.

It offers basic instruction on the operation and programming of computers, touching on all aspects of their operation from home to basic business use. It also

opens the way for further, more comprehensive study in data processing and programming.

Some of the correspondence schools, including Stotts, offer various courses for people with different levels of competence in computer use.

Parts A and B of the Stotts course is Data Processing which runs for a year at a cost of \$500.

The other course available is basic programming which costs \$300.

A spokesman for Stotts said: "We don't offer an elementary course; these are mainly for people already in the computer industry."

"We point out to all people who wish to enrol that taking the course doesn't necessarily guarantee employment in the field — to do that you have to take a degree or diploma course at one of the CAEs or a University."

The International Correspondence School (ICS) does offer general computer instruction courses ranging in price from \$1200 to \$480.

There are five main courses available, the first being basic familiarisation and programming. The second course is an all-embracing computer instruction taking in the main facts of computer operation.

The other courses vary from one aimed at office managers and designed to give them a basic understanding of how computers work, and general programming.

These courses are good for the home user who does not want to get into the heavy side of computer usage.

Obviously there are lots of courses about for the differing levels of computer competence its up to the prospective student to find out which one best suits his or her abilities.

Local technical colleges seem to be the best place to start. They are a mine of information about course structures.

The Universities and CASs during their semester breaks, often provide non academic courses in everything from computer use to gardening. These courses are usually advertised in local and metropolitan newspapers about a month before the courses start.

Adult education groups are also a good place to investigate basic courses.

While courses offered at these institutions change from year to year the people running them will be able to direct a would-be home computer operator to the best source of information.

THE AUSTRALIAN College of Data Processing in Brisbane has designed a series of courses to update the knowledge of management in the essentials of data processing. The courses include general

data processing, micro and mini computer capabilities, principles of systems selection and assessment.

There is also a six month full-time data processing course specifically for micro and mini computer programmers. The response to the courses has been varied.

"Some firms," says Ruth MacKay, marketing co-ordinator of the college, "required all their staff who would come into contact with the computer, or would require information from it, to attend at least 36 hours of classes. At the other end of the scale was the professional association having an in-house programme arranged for its members."

According to Ruth MacKay, Australia has some of the world's top data processing brains, but management in general has not learned to make use of them.

"The number of businessmen who don't know enough about computers is evenly matched by the number of 'super' salesmen who are able to deliver them the 'ideal' system," she says.

"All too often however, it is too costly, too small, or simply cannot do the job it is intended to do. Surveys show that the main reason for dissatisfied users is the inability of the user to independently specify his needs, and assess the proposals put forward by the sales people.

She says the prospective user relying on the salesman to guide him should have

the courage to say "hold on; I don't know what you are saying, please talk in terms I can understand".

"Even given an easily understood layman's sales talk, many businessmen don't know enough about modern data processing techniques to check the validity of what they are being told.

"As the new revolution in business procedures 'hots up', it's going to be the dated executive that will find it hardest to live on the dole cheque," says Miss MacKay.

She says she was taken aback when her college offered a free seminar to Brisbane businessmen and for the most part received negative responses. The seminar was organised for one evening a week for two weeks; approximately three hours each evening.

A number of business people, whilst acknowledging they should attend, were scared they would not have the ability to grasp the concepts of data processing.

I tried to alleviate their fears by clearly outlining that the seminar was specifically arranged to dismiss these very fears. Nevertheless, they still declined our invitation."

"There were those too, who, could not find the time to attend because they were playing squash or tennis those particular evenings. Yet they were given two weeks notice of the seminar." □

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In the world of personal computers there is just one that is known as the best: the PET

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The Pet communicates in BASIC—the easiest computer language. Easy to learn and easy to use, BASIC has now become the standard for personal computers, with literally thousands of programmes available. The PET is also programmable in machine language, allowing more efficient use of the system.

The full-size keyboard is capable of producing letters, numbers and graphic symbols. Upper and lower case is standard. Characters appear

on the screen in a pleasant green colour designed to reduce eye fatigue and may be displayed in normal or reverse print.

PET's IEEE-488 Bus—just like H.P.'s mini and full size computers—permits direct connection to over 200 pieces of compatible equipment such as counters, timers, spectrum analysers, digital voltmeters and printer plotters from H.P., Philips, Fluke, Textronix and others.

The full range of Commodore Disk Drives and Printers are plug-compatible with the PET and a comprehensive range of cassette and disk based programmes are available through the extensive network of Commodore Dealers.

APPLICATIONS

The Commodore PET is a creature of many faces. Its applications are limited only by the user's imagination.

The future of the PET is virtually unlimited; its present capabilities are already many and impressive. As a personal computer, the PET can teach languages and mathematics; play games; create graphic designs; store meal recipes and change

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number of portions; maintain budgets, personal records and checkbooks; operate appliances and temperature controls.

As a management tool, it delivers the information the executive needs, in the form he can use, and available to him alone. Trend analyses charts and graphs can be almost instantly available.

The professional may use the PET for maintaining appointment schedules, recording income and expenditures and filing all the specialized information and forms he may need to make his work more efficient—from medical records for a doctor to income tax computations for an accountant.

The engineer, mathematician, physicist, has a tool far superior to the very best programmable calculators yet developed... at a cost that is comparable...and with almost infinitely greater versatility.

And the businessman has a computer that can maintain inventories, keep payroll records, operate accounts payable and receivables, issue cheques and handle correspondence.

Commodore PET 4016 Computer Technical Specifications.

Computer/Memory

Read/Write Memory (RAM) 16K bytes available to the user.

Read Only Memory (ROM) 14K bytes in total, divided into:

8K BASIC interpreter available immediately you turn on your PET.

5K Operating System

1K Test Routine

The 6502 micro-processor chip makes the PET one of the fastest and most flexible BASIC systems. Significant features of Commodore BASIC are:

- 960 simple variables
- 960 integers
- 960 string variables
- 960 multi-dimensional array fields for the above 3 types of variables
- Up to 80 characters per program line with several statements per line
- Upper/Lower case characters and graphics capability
- Built in clock
- 9-digit floating point binary arithmetic
- True random number generator
- Supports multiple languages; machine language accessibility

Keyboard

74-Key professional keyboard.

Separate calculator/numeric pad.

Upper-case alphabetical characters with shift key to give 64 graphics characters.

Can be set for lower case and shifted upper case characters.

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40 characters wide by 25 lines (1000 characters in 8 x 8 dot matrix).

23 cm screen phosphor screen.

Brightness control.

64 ASCII plus 64 graphics characters.

Blinking cursor with full cursor control,

including programmable control.

Screen editing capabilities

Full cursor control (up, down, left, right).

Character insert and delete.

Reverse character field.

Overstriking.

Return key sends the entire line to the CPU regardless of cursor position.

Input/Output

8 bit parallel input/output port.

IEEE-488 Bus (HP-IB and IEC Bus) allows up to 12 other peripherals to be connected.

Two cassette ports.

Video signals for additional displays.

Serial output port.

Technical Data

Dimensions: Height 355 mm (14"), Width 419 mm (16.5"), Depth 185 mm (7.25").

Shipping Weight 20.9 kg (46 lbs).

Power requirements 240V + 10%, Frequency 50 Hz, Power 100 Watts.

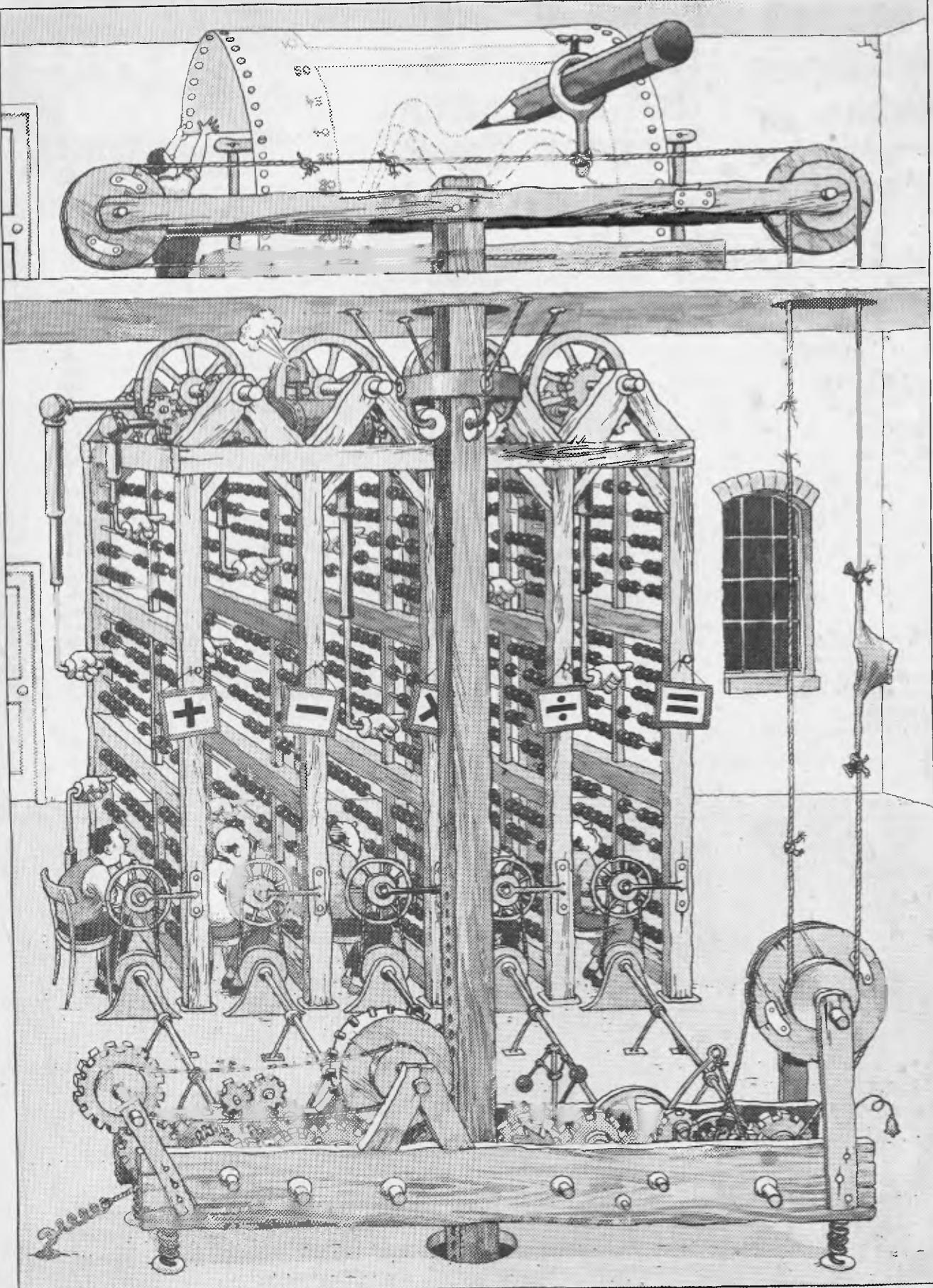
Commodore BASIC

APPEND	GOSUB,RETURN STOP	SPC
BACKUP	IF..THEN	SYS LEFT\$
CLOSE	INPUT	VERIFY RIGHTS
CLR	INPUT *	WAIT MID\$
CMD	LET	CHR\$
COLLECT	LIST	SGN ASC
CONCAT	LOAD	INT LEN
CONT	NEW	ABS VAL
COPY	ON..GOSUB	SQR STR\$
DATA	OPEN	SIN TI
	POKE	COS TI\$
DEF/FN	PRWT	TAN ST
DIM	READ	ATN DS
DIRECTORY	RECORD	LOG DS\$
DLOAD	REM	EXP +
DOPEN	RENAME	AND -
DSAVE	RESTORE	OR *
END	RUN	NOT /
FOR/NEXT	SAVE	TAB ↑
GET	SCRATCH	POS π

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MICROCOMPUTER enthusiasts can enjoy a smorgasborg of equipment later this month at Sydney's centrepiece. That's the venue for Data '81, a comprehensive display of computers and related information technology to be held from August 25 to 27.

Manufacturers from Australia and overseas will be showing off their wares ranging from mainframe to micro. Perusal of pre-exhibition publicity reveals that there will be a heavy emphasis on microcomputers which will interest the small businessman as well as the home user and educationist.

Visitors will have ample opportunity to inspect the equipment and to discuss it with consultants on the display stands.

Unlike many such exhibitions, Data '81 is not a trade-only show but is open to the public, thereby opening up sales leads for the micro exhibitors in particular.

Here are the exhibitors, the stands on which you'll find them, and what you'll see.

Adaps Ltd.: (Stands 8 and 9). Business mainframe software. Adaps will demonstrate software on microcomputer.

Adler Business Machines: (Stands 1 and 2). Calculators, word processors, and small business computer systems. The display will include the new Easywriter, a word processor priced under \$10,000 driven by the same 96K microprocessor as

the larger models of the Bitsy series.

AM Jacquard: (Stands 45 and 46). J500 standalone word processing system and its latest software.

American Micro Systems: (Stand 42). New software and hardware packages for market research, short term money market, bill of materials, word processing and data communications.

Anderson Digital Equipment: (Stands 37 and 38). Models of the newly-acquired Centronics printer range up to 600 lines per minute, the North Star and ADE microcomputer systems.

AWA: (Stand 47). The Micromax small business computer system.

Calidad Magnetics: (Stand 59).

Caringbah Sheet Metal (Aust): (Stands 71 and 72). EDP storage systems.

Commercial Computer Centre: (Stand 48). Syncrom magnetic media.

Computer Reference Guide: (Stand 18)

Computer Supplies: (Stand 10).

Computer Tape Storage: (Stand 22).

Control Data (Aust): Stands 75 and 77). Software targeted at specific industries and areas, including education.

Cooley Douglass and Associates: (Stand 5). Independent software with consultants to discuss systems development.

Datacraft: (Stand 73).

Datatel: (Stand 28).

Dicker Data Projects: (Stands 11 and

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5 1/4" LOBO floppy drive (Add-on)	\$470	Parallel Interface cards	\$110
Dual LOBO 8-inch double sided double density floppy drive	\$3200	CCS Serial communication card	\$170
Dual LOBO 8-inch single sided double density floppy drive with controller (1.1 Mb)	\$2450	5 1/4" LOBO hard disk with inbuilt 5 1/4" double sided, double density floppy drive backup (5Mb)	(call)
16K RAM expansion card (microsoft)	\$240	8" LOBO hard disk with inbuilt 8" double sided double density, floppy drive for backup. (10Mb)	(call)

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12). All the good things they advertise in Your Computer.

Dick Smith Electronics (Stands 13 and 14). The Exidy Sorcerer and Dick's own Systems 80. A wide range of programs will be running on a variety of computers. **Digital Electronics**: (Stands 15 and 16). Its own Australian-made computer systems and other microprocessor-based equipment.

Fliway Computer Transport: (Stand 74).

Graphic Directions: (Stand 70). Data '81 organisers.

Hanimex: (Stand 17). The Zilog MCZ 1-05 microcomputer and the Sanders Media 12-7 multi-font printer as well as other equipment.

Hoskins, W.E.: (Stand 33).

Ibex Computers Australia: (Stands 29 and 30). Its range of micros starting at the Ibex 2000 and including the Ibex 7201 which is used for medical and dental applications. Also the Datasouth DS 180 high speed dot matrix printer.

IBM: (Stands 84 and 85). They're keeping it a secret.

Kenelec (Aust): (Stand 25). The R2E Z80-based computer system from Honeywell-Bull and much more.

ICL: (Stands 3 and 4). Packages include STARS, SAFES and SPARES.

Keyboard Training: (Stand 19)

Kwikasair Express: (Stand 26).

Liveware: (Stand 60). □

McGraw Hill International Training Services: (Stand 79).

Magnetic Media Services: (Stand 32). Full range of Australian and imported media, computer link tape evaluators, dual link furniture, ribbons, decollators and bursters and a whole lot more.

Memorex: (Stands 54 and 55). A wide range of IBM-compatible communications equipment plus a dynamic display hooked up to a system in the company's Neutral Bay office.

Microsystems: (Stand 20). Actively involved in micro publishing and microcomputers.

MIS: (Stands 84 and 85).

Mitsui Computer Systems: (Stand 6). Among other things, their Diablo printer.

Moore Paragon Australia: (Stands 39 and 40). Business forms.

MSCO: (Stand 53). Special interest software for accountants.

Omni Office Furniture Systems: (Stand 66). An office display suite.

O'Reilly Computer: (Stand 83). FAMAS, DOCGEN, CHEMPAC and Microtiger packages demonstrated on the Japanese ABC series of microcomputers.

Overseas Telecommunications Commission: (Stand 7).

Racal Electronics: (Stand 56). Something for everyone from first-time users to industry giants.

Saunders, J. & Sons: (Stand 80). Raised

printed business cards and letterheads for word processors.

Sigma Data Corporation: (Stands 57 and 58). Among many items, the new series 80 word processors.

Sola Basic Australia: (Stand 78).

Stevenson, John G. & Co.: (Stand 42).

Syfar: (Stand 67). A variety of software.

Tandy Corporation: (Stand 27). Just about everything for which Tandy is famous in microcomputers.

Tektronix Australia: (Stand 21). A selection of computer graphics products including high resolution and colour terminals, desktop computer graphics and minicomputers.

The Computer Company: (Stands 68 and 69). A recently-released computer system based on the Panasonic 740 with a price tag under \$10,000.

The Computer Resources Company: (Stands 43 and 44). Computer room furniture, tape and storage systems, mobile terminal tables.

United Data Centres: (Stand 31).

Wilke Business Forms: Stand 61). The tabletop Model 2202 deleaver.

Wilson Bros (Printers): (Stands 35 and 36). □

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The electronic revolution is providing a wealth of new opportunities for everyone — and, for a change, that includes the disabled. FRED SYMES visited the National Association for training the Disabled in Office Work (NADOW) for this report:

COMPUTING -THE EQUAL OPPORTUNITY INDUSTRY?

TOUCH WOOD, but I've never had a day's sickness, apart from the odd cold and a few cuts and bruises, in almost 50 years of living. Members of my family have been similarly fortunate. So it has been a little difficult for me to respond positively to the International Year of Disabled Persons promotion.

But that negative attitude has changed dramatically.

"Get a story to show how the age of the computer is opening up a real chance for employment of the disabled," I was instructed by our managing director.

With some reluctance, I must admit, I set about the task.

Did you know there are more than 400 million disabled people in the world today?

If that sounds bad, just ponder on this: United States statistical experts predict that by the year 2000 the ratio of disabled to able-bodied will be 1:1. Now, when you get that sort of news you have to sit up and take notice.

While it may not be possible to do much in the way of useful employment for the mentally handicapped there is no earthly reason why the physically handicapped should be doomed, as in the recent past, to a lifetime of inactivity, frustration and boredom.

These physically handicapped, on average, have the intelligence and mental capacity common in any other group within the world at large.

The only difference between them and the likes of you and me is that we are more mobile, maybe have clearer diction and have all our limbs. And remember, a misshapen carrot tastes just as good and

contains the same nutritional value as a perfectly-shaped carrot given that the chef treats them equally in the cooking.

What I'm saying is that if, as an employer, you ignore the physical aspects, you can achieve the same intellectual productivity from a disabled person as an able-bodied one.

Let's turn to an example from a paper delivered to the eighth World Computer Congress last year by Miss Sheila Blackmore, founder of the National Association for Training the Disabled in Office Work.

"As a prospective employer reviewing two job applications would you employ Eric?" she asked.

"Eric (22) studies part time for a BSc towards becoming a computer systems engineer, trains up to 30 hours a week for world competition archery, basketball and snooker. He is a Life Line volunteer worker, an office bearer in an archery club and has coached and managed local sporting teams. He is a licensed driver. For added relaxation he goes "bush" in the sidecar of a friend's motorcycle to camp, fish and hunt.

"I'm sure that everyone at this conference would be keen to interview and employ a man like that."

Miss Blackmore then explained that Eric is a paraplegic as the result of a shooting accident when he was 14. The world sporting competition was the Olympics for the disabled and his training was done in a wheelchair.

In Australia 10 years ago, she continued, young men like Eric would have had the following employment options:



1. Process work in a sheltered workshop or factory;
2. general clerical work in an office, bank or insurance company or;
3. university study which, after graduation, could well result in non-acceptance of their skills because of lack of work experience and the fact they were disabled.

"Today," said Miss Blackmore, "young men like Eric are graduating from the NADOW Computer Training Scheme with qualifications and business references which equip them for full-time employment in the computer industry."

•And Eric? A NADOW graduate, he is working full time as a programmer.

What is the definition of disabled person? For too many of us able-bodied types it means someone in a wheelchair. Miss Blackmore puts us right on that.

She says that less than 10 per cent of all disabled are in wheelchairs. There are many hidden disabilities — the cardiac, the diabetic, the haemophiliac, those with back, shoulder and arm injuries.

"These people are frequently in need of assistance by way of resettlement programs and once trained can become as independent and self-directing as any other member of the work force," she says.

While accepting the definition that a disabled person is an individual whose prospects of obtaining and retaining suitable employment are substantially reduced as a result of physical or mental impairment, NADOW encompasses a group of people with absolutely no mental problem.

Trainees undergoing instruction in computer programming and word processing at the NADOW offices.



have the mental capacity of an Einstein. As such, their real challenge is just like anyone else's.

- "They don't want to sit at home doing nothing when they could pursue a worthwhile, interesting and challenging career."
- "They don't want to live on government pensions when they are perfectly able to earn their own living."
- "They do want to enjoy many of the better things of life that money can provide and so they'll have to work hard to get what they want."

Miss Blackmore told the conference that the philosophy of NADOW had always been to train on-the-job to meet manpower needs. NADOW trainees were coached alongside able-bodied staff in the commercial division of NADOW Office Printing Services Pty Ltd. At the end of 13 weeks' training they graduated with a commercial reference to compete for normal jobs in the open market.

The course comprised general office procedures plus experience in the use of modern office machinery.

Trainees have included quadriplegics, blind, deaf and other physically handicapped, whether congenitally, through accident or by disease — a multi-diagnostic program.

It was against this office training background that in 1973 NADOW established its Computer Training Scheme, said Miss Blackmore.

As far as is known it was the first such scheme for the disabled anywhere in the world.

NADOW's computer scheme, Miss Blackmore told the conference that computer programming was thinking oriented. No great manual dexterity was required so there was no reason why handicapped people should not be successful in computer careers.

Before being accepted for the computer course a trainee had first to complete the office procedures course during which individuals were under constant review as to their suitability or otherwise for a computer career, explained Miss Blackmore.

"There are those who may have been thought suitable initially but whose work aptitude had indicated the contrary. By the same token a number of trainees will have demonstrated such competence and ability to learn that they will immediately be considered as potential candidates for sponsorship to the computer training course.

"Before they are assigned to the course, however, they undertake an aptitude test and, in some cases, a second opinion may be sought using psychological appraisals.

"If, and only if, these clearly indicate the trainee under review has the potential to succeed in a data processing career, various job opportunities will be discussed with them."

Miss Blackmore continued that the NADOW candidate for computer training had therefore been subjected to the most exacting tests and appraisals and was extremely keen and highly motivated to make their subsequent training a great success.

The first facet of the training was a self-study program at NADOW using an IBM 2741 remote computer terminal hooked up by land line to IBM's main computer system in Melbourne. Combined with this were films, observation visits to computer installations, lectures, audio visual courses and self-study courses on microprocessors. All this introduced the trainee to the basics for whichever computing field he or she had chosen.

Then follows a four or six month course of on-the-job training with a sponsoring company. An assessment at the end of this intensive training is sent to the referring doctor and the Commonwealth Department of Employment. A business reference is issued by the sponsoring company to those trainees who have proved their efficiency.

"The NADOW scheme is particularly exacting," said Miss Blackmore. "It proves the statement that the disabled person who can become well qualified for a career is no longer disabled. It endorses the view that we can do things with technology that we can't do without it, and that with the right attitude a man is the master of his own future. And it emphasises that handicapped people pose soluble problems."

Employment for the once-considered unemployable is but one benefit of the NADOW program. There are also significant benefits for the Australian taxpayer.

As Miss Blackmore pointed out, for every 20 people who cease to become pensioners, the Federal Government will save about \$56,000 in invalid pensions in one year. Even more important, she added, as productive people they contributed about \$32,000 as taxpayers.

The message is there, strong and clear; handicapped people are employable, not out of pity but as true equals of the able-bodied.

Continued on page 83

DISK VOLUME *189

*A [E] HELLO
*T [B] YOUR COMP JULY2
*T [C] APPLE COL
T [D] SCH1
T [E] SCH2
T [F] APPLE
T [G] YC-FET

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Computer Literacy or Bust

by

FEW PEOPLE are even aware of the concept of an information society - let alone how to prepare for it. Australia is still planning for growth and employment based on an industrial society; a principle left behind some time ago by some other developed countries.

Computers and communication systems provide the basic building blocks of the information society. But these have both been available for over twenty years. Why are nations only now changing their views of the potential of combining the two?

The first is cost. For example, computer memory which cost over ten thousand dollars twenty years ago, now can be purchased for \$1.50. Only fifteen years ago, the monthly cost of a satellite circuit to USA was \$1300, today it is \$33. Costs will continue to drop.

In every developed country in the world, there are plans to install computers in the home this decade. This would allow people to connect into a world-wide infor-

Professor V.X. Gledhill, Dean of the Faculty of Mathematical and Computing Sciences at New South Wales Institute of Technology.

mation network, using communication satellites.

It is now possible to store the entire contents of the Encyclopaedia Britannica on a single disk, about the same size as an L.P. record. Using the keyboard of a small computer, any item of information can be retrieved, and displayed on a TV screen, within seconds.

Computers in the home could replace newspapers.

Home computers will allow you to compare prices for goods all over the country, and order at the right price from your home.

The automated office is closer than you think and may mean that you can do most of your work from a terminal at home.

And schools? They may close, as we know them, and return much of the education to the home...

However the United States and Australia are not prepared for such developments. Less than two percent of the population has any working knowledge of computers. With that level of ignorance, how can we expect to move smoothly towards an information society? This is in stark contrast to the United Kingdom, France and Germany, who have massive education programs in computer literacy for all high school students.

What are the implications of failing to provide a basic computer awareness program?

When something goes wrong with an account, or a reservation is not made correctly, how often have you been given the excuse that the computer made an error? Or how often have you been told that you cannot do this, or that, because the computer will not allow it? Are you in a position to know if these are correct excuses? Or

are the people giving you those reasons just hiding the truth behind the black magic of a computer?

Witch doctors used the fear of the gods, to exploit the ignorance of tribesmen, and to control the population. The witch doctors of tomorrow might work the same way — by exploiting people's ignorance of computers.

National governments and large corporations could develop computer systems that do not allow for individuality and force us all into the same mould. If the population is not "computing literate" it will not be able to question these systems, and insist on their modification.

What should we do? The answer lies in education at all levels. Starting with schools, basic computer awareness should be taught to every school student.

But, the shift to the information society is happening so rapidly, that we cannot afford to wait until those students move into the workforce. We shall probably have to use computers themselves as teaching machines, to educate workers, managers, and housewives, in basic computer literacy.

Only in that way can we hope to create an environment which will allow us to move smoothly from the Industrial to the Information Society.

All of us are affected by computers in one way or another. So, it is important that we become more involved in deciding how they will be used. In order to do this, we must understand what they can do and how they work so that we can make informed decisions. In the future, we will all have to use computers to improve our life.

Today, most telephone and electricity accounts are produced by computer. Many hotels and motels use computers to arrange room allocations and to print out accounts. Airline bookings and theatre reservations are often controlled by computers.

Some supermarket chains use computers to assist in their entire operation. They produce the customer charge slip at the checkout point, keep control of stock both in the warehouse and in individual stores, and predict future shopping trends.

It is important to note, however, that each of these applications rely upon an expert operator as a "go between" — we do not work directly with the computer. In the future, we shall become more directly involved with computers ourselves and will have to develop confidence in their use.

As evidence of this, we can consider some recent developments in the application of computers.

When we are planning a trip, we often wish to make enquiries about routes, timetables, or fares. One particular bus line has installed a number of computer display units at its terminal to allow passengers to make these enquiries directly.

The passenger types in the details of the planned trip. The computer responds by displaying information about alternate routes, fares, and times of departure.

In France, the telephone authority is considering replacing telephone books with electronic directories. Thirty million computer terminals will be placed in homes and to look up a number, you would type in the person's name. The computer would respond with the address and telephone number of that person. This would save the enormous cost of printing and distributing paper telephone books and would allow regular and inexpensive inclusions of new or changed numbers.

Many banks have installed "automatic tellers" which provide a 24-hour service to their customers. If a client wants to make a deposit or withdrawal, he or she communicates directly with the computer through a "street front" computer station. The client uses a series of typewriter-like keys to provide identification and details of the deposit or withdrawal.

Bills can now be paid directly from a bank account through a "touch-tone" telephone in the home. A telephone call is made to the computer, which answers with a "voice output" device (like an advanced version of a talking toy). The computer requests details of who is to be paid and how much. This information is given to the computer through the telephone key-pad. When the information is complete and verified, the payment is forwarded directly from the bank and your account is reduced by the correct amount.

It is important that society, at all levels, improve its "computer literacy" — that is to be able to use a computer confidently and understand how it operates.

Just as general literacy allowed the

development of Western society through increased knowledge and transmission of ideas, it is believed that computer literacy will be important to allow people to actively contribute to the development of the world of tomorrow.

Many of the concepts and attitudes relating to computing need to be formulated at an early stage alongside other disciplines such as social studies, mathematics, science and history.

In this way computing will be placed in its correct perspective by the students. This timing is, unfortunately, not available to adults, who need to be informed about computers — most of their views and prejudices are firmly in place.

School Computers

A course on computer literacy should not be left to the mathematics teachers but should be presented by Science, Economics or General Studies Departments.

If the course requires specialist knowledge of high school subjects then it is being taught inappropriately. That would be similar to teaching reading based solely on fiction or on technical readings.

The overall objectives of a computer literacy course could be summarised as follows.

On completion of the course, the student should be able to:

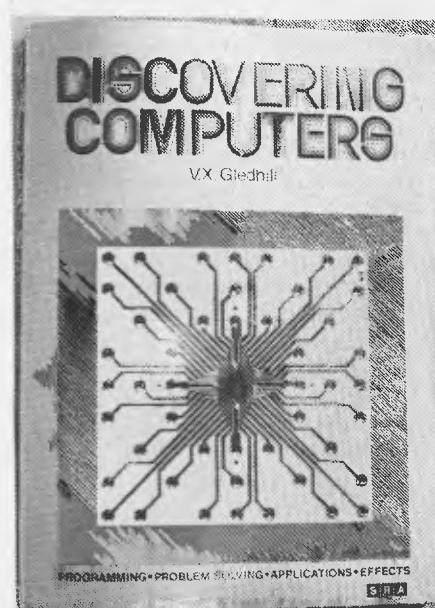
- feel confident in using a computer keyboard for entering facts into a computer and requesting information.
- attempt a problem on a formal basis and have the confidence to try to find a solution.
- understand the operation of a computer, particularly its sequential nature.
- be able to solve simple problems using the computer and elementary programs.
- appreciate the ubiquitous nature of computing and its range of application.
- look forward to possible developments in the next decade.
- participate in discussion of social issues including the work environment, privacy, control of society, cultural sovereignty and so forth.

It would be an advantage for students to have access to a computer terminal, or microcomputer. However, such a course could be operated without such a facility. The deficiency could be made up by organized visits to a local computer installation.

The main aim of an introductory computer session would be to give the student confidence in operating the keyboard of a computer terminal. Students are usually apprehensive about pressing keys in case they make a mistake.

It is important that the student feels at ease — this can only be achieved by considerable use. Demonstration programs have been developed for students which require quite a deal of keyboard data entry to help overcome initial anxiety.

At the same time as the student is learn-



Professor Gledhill's newly launched book.

ing how to use the keyboard/screen, such a demonstration program could also present material to the student about the various operations that can be performed by a computer.

Problem solving is an important skill. It is also a practical skill in as much as we only develop expertise through imitation and practise.

Techniques of problem solving are applicable in every endeavour. Yet, there are few areas in the modern high school curriculum that allow a formal analysis of the techniques of problem solving. Some more enlightened teachers recognise the importance of problem solving and introduce some instruction in the methodology into their courses on mathematics (geometry), science, or social studies.

The main function of a computer is to help us solve problems. It is, therefore, most appropriate that the opportunity be taken in a computer literacy course, to examine the techniques of problem solving — these methods are related to computers at times, but are basic to all classes of problems.

This topic should be fascinating and fun at the same time.

Fascinating, because students for the first time should gain an appreciation of the fundamental nature of problem solving to all human activity. It should be fun because the problems should be broadly-based puzzles — not based on any prior knowledge, but enquiring initiative to find the solution.

Later, the course should include instruction on solving a number of computer related problems. It is important that the student undertake a large number of exercises and understand the solution. Only in this way will students develop sufficient confidence.

The objectives of this section of the course should be to:

- critically analyse a problem statement to determine if it is complete and logical.
- identify the class of problem, in order to select an appropriate technique for its solution.
- proceed to search the selected solution domain in a rational way.
- by practise, imitation and repetition, develop problem solving skills.

The students general knowledge of problem solving should be transferred into the domain of computers. At the same time, the concept of a "general solution" to a problem has to be imparted — both for its own sake and because it is a requirement or limitation of computer programs.

These concepts can be difficult unless they are handled properly. It is a concept that is often overlooked.

The notion of a general solution is probably not one that has been dealt with formally in the school curriculum before — but students KNOW of the notion because

they all use general solutions for, riding bicycles, or buying an ice cream.

They should be able to recognize that there are variables in all these general solutions. Teachers could, for example, have the student write down a general solution to look up a telephone number — what are the variables? Riding any bicycle?

These general solutions should be placed in sequential form, because sequential logic is the essence of the operation of a computer.

The concept of a sequential solution might not be new — some students might be used to solving problems "step by step". However, the ability to devise, and record, a sequential solution is often foreign to even bright students who can not order their thoughts. They will have to do a number of similar examples until they are competent.

Students can use any of several methods to record their sequential solutions. Flow charting is one satisfactory method.

It is quite important, regardless of the ability of the student, that they actually test their solution on trial data.

Included in the course outline should be exercises to allow them to prepare sample data sheets and use them to test the solution. This will expose a number of difficulties that can then be corrected.

How Computers Work

Any curriculum dealing with computers cannot avoid describing how a computer operates. Unfortunately, some teachers take this as a licence to air their knowledge of the binary number system and electronic switching circuits — nothing could be less relevant.

The operational characteristics of computers were defined in very simple terms over thirty years ago and have not changed since — the technology driving them has.

The three most important features of a computer are:

- its functional components from a programmer's point of view.
- the concept of a program and its execution.
- the sequential nature of the operation of a computer.

If the student can grasp these fairly straightforward ideas, much of the previous work on sequential problem solving will fall into place. Also the student will be better informed to be able to construct his or her programs (Section 3.5) and understand the potential of computers.

Programming

All students who can read write programs.

There is far too much mystique attached to programming — it is often seen as an art practised by the privileged

few. It is important that this impression be set aside.

Certainly, some people have more skill than others in programming and problem solving, just as some people are better readers. However, any child can write small programs and appreciate what is involved in writing larger ones.

Developing skill at programming should not be the aim of such a course. Students with latent ability in this area will realize that they have talent for work and can proceed to programming courses.

At the simplest level, something like the TURTLEGRAPHICS can be used with a microcomputer. Consider the following program called SQUARE:

```
MOVE 50  
TURN 90  
MOVE 50  
TURN 90  
MOVE 50  
TURN 90  
MOVE 50
```

to cause a square to be drawn on the screen. This is not beyond the ability of most students.

The BASIC programming language, used sensibly, can also give the students some actual programming experience.

Programming should be a segment of a computer literacy course, but should not dominate. There is often a temptation to move students to the extremes of their programming skill. This would be inappropriate and serve to defeat the overall purpose of the course.

Computer Applications

In only thirty years, computers have moved from the scientist's laboratory to the very centre of our society.

Computers have the highest rate of adoption of any technology — including electric motors, and the wheel.

Large organizations such as banks and airlines are now entirely dependent on computers for their day-to-day operation.

At the other end of the scale, people are using computers as word processors, instead of typewriters, and a whole new range of toys have been introduced.

One successful way of covering a wide range of applications is to collect a series of resource articles from press reports describing various things that computers can do.

In this "information rich" age, it is also important that students learn to carry out their own investigations.

It might be of some value, at this time in the course, to demonstrate how to use libraries and computer based search techniques to carry out individual enquiries. Have different students investigate broad areas and make classroom presentations in such areas as finance, medicine, manufacturing, design, the arts

and so forth. In this way, students will gain a patchwork impression of the application of computers.

Computers and the Future

If it is assumed that a computer literacy course is presented to students between the ages of 14 years and 16 years, they will be in their mid-twenties by 1990.

Technological forecasters have painted a totally different world only a decade away. It is important that the students consider possible developments in computers and information technology to understand the society that they might be moving into.

Likely developments in office automation, information transmission, artificial intelligence and robotics, must be included in such a course.

It is difficult to nominate an authoritative source that could be used by school children. Again, it might be most appropriate for collections of resource articles from popular journals to be circulated amongst schools to give teachers a set of background reading for students.

Much has been written about the effect of computers on our society.

It seems every technological advance brings both advantages and disadvantages.

Radio has brought entertainment,

news, and warning of danger to people throughout the world — yet it has also been used as a tool for propaganda to inflame racial hatred and war.

The motor car allowed people to become more independent and was the basis for the design of our large cities — yet thousands are killed by cars each year and the pollution caused is a major health hazard.

Computers represent one of the most significant technological advances that man has made. So far, there has been very little public discussion about how we would like them to be used.

It is our responsibility to consider the issues involved and to make our views known. Decisions about the use of computers must not be left solely in the hands of technologists and politicians.

What are the issues that should be considered? They include unemployment, privacy, computer crime, quality of life, and job satisfaction.

This is a most suitable time to introduce classroom debate and discussion. Students should be exposed to as many alternate views as possible — they are capable of forming their own opinions.

Some people see computers as desirable, others see them as a technological threat to humanity.

Some people see the introduction of computers into all areas as inevitable, while there are others who believe we can turn back the clock and return to "better times".

The general view would be that computers have both advantages and disadvantages, and that sensible planning will allow them to be introduced in a way that will benefit us most.

Unfortunately, we are leaving the decisions about how and when computers will be introduced to the "experts" with their own self-interests.

Computers are so widespread and potentially so influential that their indiscriminate introduction could disadvantage the majority of society.

Computers are not complex. The social issues are.

It is only through understanding the operation and potential of computers that the social issues can be discussed intelligently.

That discussion should involve all of society, not those currently holding knowledge of computers.

In order to allow the widest possible debate, it is important that every school student learn the fundamentals of computing and problem solving. This should be contained in a "computer literacy" course taught to high school students as part of a general studies program. □



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In last month's introductory article, LES BELL covered the way CP/M interacts with the user. This month, he examines the way other programs can be interfaced to CP/M.

DELVING DEEPER INTO CP/M

A DISK Operating system, by itself, isn't much good unless its facilities for loading and storing files are available to programs, as well as the operator at the console. CP/M has two levels of interfacing complexity, at each of which the power of the disk system is made available to programs running in the system.

First, it's necessary to understand the way CP/M works. CP/M is made up of four parts: the BIOS (Basic I/O—Input/Output—System), the BDOS (Basic Disk Operating System), the CCP (Console Command Processor) and the TPA (Transient Program Area). The first three components move around in memory, depending on how much memory is available in your system; they always live at the top end of memory (see fig. 1), while the TPA always begins at location 0100H. Obviously, the higher the CCP and the other parts are, the bigger the TPA is.

At the very bottom of memory, below the TPA, is 256 bytes of RAM used for system parameters and a couple of jumps, interrupt restarts, and miscellaneous variables. In particular, location 0 contains a jump to the warm boot loader of CP/M, and location 0005 contains a jump to the entry point of the BDOS. Note that on the TRS-80 and other 'special' versions of CP/M, the system information and TPA will be much higher in memory (usually 4300H), and will require modified versions of most programs to run.

The BIOS is the part of CP/M that varies from machine to machine, and contains subroutines to perform console I/O, home the disk head, select a disk drive, set the track and sector number, read a

jmp boot	;entry point from cold boot load
jmp wboot	;warm start
jmp const	;check console status
jmp conin	;console input routine
jmp conout	;console output routine
jmp list	;list device output routine
jmp punch	;punch output
jmp reader	;reader input
jmp home	;move to track 0 on selected disk
jmp seldsk	;select disk drive
jmp settrk	;set track number
jmp setsec	;set sector number
jmp setdma	;set dma address
jmp read	;read selected sector
jmp write	;write selected sector
jmp listst	;return list status
jmp sectran	;sector translate subroutine

Table 1. BIOS entry points.

BDOS Function Summary

Func	Function Name	Input Parameters	Output Results
0	System Reset	none	none
1	Console Input	none	A = char
2	Console Output	E = char	none
3	Reader Input	none	A = char
4	Punch Output	E = char	none
5	List Output	E = char	none
6	Direct Console I/O	see def	see def
7	Get I/O Byte	none	A = iobyte
8	Set I/O Byte	E = iobyte	none
9	Print String	DE = &buffer	none
10	Read Console Buffer	DE = &buffer	see def
11	Get Console Status	none	A = 00/ff
12	Return Version Number	none	A = version
13	Reset Disk System	none	see def
14	Select Disk	E = disk number	see def
15	Open File	DE = &fcb	A = dir code
16	Close File	DE = &fcb	A = dir code
17	Search for First	DE = &fcb	A = dir code
18	Search for Next	DE = &fcb	A = dir code
19	Delete File	DE = &fcb	A = dir code
20	Read Sequential	DE = &fcb	A = err code
21	Write Sequential	DE = &fcb	A = err code
22	Make File	DE = &fcb	A = dir code
23	Rename File	DE = &fcb	A = dir code
24	Return Login Vector	none	HL = login vect
25	Return Current Disk	none	A = disk no
26	Set DMA Address	DE = &dma	none
27	Get &alloc_vec	none	HL = &alloc_vec
28	Write Protect Disk	none	see def
29	Get R/O Vector	none	HL = R/O vector
30	Set File Attributes	DE = &fcb	see def
31	Get &dpb	none	HL = &dpb
32	Set/Get User Code	see def	see def
33	Read Random	DE = &fcb	A = err code
34	Write Random	DE = &fcb	A = err code
35	Compute File Size	DE = &fcb	fcb.ranrec, fcb.ovflow
36	Set Random Record	DE = &fcb	fcb.ranrec, fcb.ovflow

Table 2. BDOS Functions. Notes: 'see def' means that the reader is referred to the Digital Research manual 'CP/M 2.0 Interface Guide' for full details. The '&' symbol means 'address of'. 'fcb' = 'file control block'; 'dpb' = 'disk parameter block'; 'alloc_vec' = 'allocation vector'; 'fcb.ranrec' and 'fcb.ovflow' refer to the random record number of a file control block.

file list program, prints contents of an ascii file on console

```

0000      org 100h
0005      bdos equ 0005h ;bdos entry point
0002      output equ 2   ;output to console
0009      printf equ 9   ;print buffer
0008      cstat equ 11  ;console status function (true if char ready)
0004      openf equ 15   ;file open
0014      readf equ 20   ;read function
;
005c      fcb equ 5ch   ;file control block address
0080      buff equ 80h   ;input disk buffer address
;
000d      cr equ 0dh   ;carriage return
000a      lf equ 0ah   ;line feed
001a      ctrlz equ 1ah  ;cp/m end-of-file character
;
; file control block definitions
007c      fcbr equ fcb+32 ;current record number (0 to 127)
;
; set up stack
0100 210000 lxi h,0
0103 39      dad sp   ;ccp stack now in hl
0104 22e801 shld ccpsp ;ccp stack now in hl
0107 310a02 lxi sp,stack ;set sp to local stack area
;
; read and print successive buffers
010a cd8bb01 call open   ;open input file
010d feff    cpi 255   ;255 if file not present
010f c21b01 jnz openok ;skip if open is ok
;
; file not there, give error message and return
0112 11a701 lxi d,opermsg
0115 cd6101 call err
0118 c33501 jmp done   ;to return
;
openok: ;open operation ok, set buffer index to end
011b 3e80    mvi a,80h
011d 32c701 sta ibp   ;set buffer pointer to 80h
;
ploop:      call gnc
0120 cd4701 jc done   ;carry set by gnc if end file
0123 da3501 mov b,a
0126 47      call keyhit ;check for key hit
0127 cd3d01 rrc
012a 0f      jc done   ;finished
;
012e 78      mov a,b
012f cd4901 call pchar
0132 c32001 jmp ploop
;
done:       ;listing done, return to ccp
0135 cd5601 call crif
0138 2ac801 lhld ccpsp ;ccp stack now restored
013b f9      sphl
013c c9      ret   ;to the ccp
;
; subroutines
keyhit:     push h! push d! push b ;check for keyboard character
013d e5d5c5 push h! push d! push b ;registers saved
0140 0e0b    mvi c,cstat
0142 cd0500 call bdos
0145 c1d1e1 pop b! pop d! pop h ;registers restored
0148 c9      ret
;
pchar:      push h! push d! push b ;print a character
0149 e5d5c5 push h! push d! push b ;saved
014c 0e02    mvi c,output
014e 5f      mov e,a
014f cd0500 call bdos
0152 c1d1e1 pop b! pop d! pop h ;restored
0155 c9      ret
;
crif:       push h! push d! push b ;print a character
0149 e5d5c5 push h! push d! push b ;saved
014c 0e02    mvi c,output
014e 5f      mov e,a
014f cd0500 call bdos
0152 c1d1e1 pop b! pop d! pop h ;restored
0155 c9      ret
;
; bdos entry point
0156 3e0d    mvi a,cr
0158 cd4901 call pchar
015b 3e0a    mvi a,lf
015d cd4901 call pchar
0160 c9      ret
;
; print error message
0161 0e09    mvi c,printf
0163 cd0500 call bdos
0166 c9      ret
;
; print buffer function
0167 3ac701 lda ibp
016a fe80    cpi 80h
016c c27801 jnz gnc!
;
gnc:        lda ibp
0167 3ac701 lda ibp
016a fe80    cpi 80h
016c c27801 jnz gnc!
;
; get next character
016f cd9801 call diskr
0172 b7      ora a
0173 ca7801 jz gnc1
;
; read another sector
0176 37      edat: stc
0177 c9      ret
;
; read the byte at buff+reg a
0178 5f      mov e,a
0179 1600    mvi d,0
017b 3c      inr a
;
; double precision index to de
017c 32c701 sta ibp
017f 218000 lxi h,buff
0182 19      dad d
0183 7e      mov a,m
0184 fe1a    cpi ctrlz
0186 ca7801 jz edat
0189 b7      ora d
018a c9      ret
;
; absolute character address is in hl
; char is in the accumulator
; is it end-of-file
; yes, jump edat
; ok, reset carry bit
;
; back to memory
018b af      xra a
018c 327c00 sta fcbr
;
; clear current record no
018f 115c00 lxi d,fcb
0192 0e0f    mvi c,open
0194 cd0500 call bdos
0197 c9      ret
;
; open: ;set up file
; open the file for input
0198 e5d5c5 push h! push d! push b
019b 115c00 lxi d,fcb
019e 0e14    mvi c,readf
01a0 cd0500 call bdos
01a3 c1d1e1 pop b! pop d! pop h
01a6 c9      ret
;
; read disk file record
0198 e5d5c5 push h! push d! push b
019b 115c00 lxi d,fcb
019e 0e14    mvi c,readf
01a0 cd0500 call bdos
01a3 c1d1e1 pop b! pop d! pop h
01a6 c9      ret
;
; fixed message area
01a7 0d0a6e6f20 db cr,lf,'no input file present on disk'
;
; variable area
01c7 50      ibp: db 80 ;input buffer pointer
01c8 ccpsp: ds 2  ;entry sp value from ccp
;
; stack area
01ca          ds 64 ;reserve 32 level stack
stack:      ;
;
; end
020a

```

sector, write a sector, and other 'primitive' functions. The operation of the BIOS is conceptually quite simple (once you've played around with it for a while), but in practice, it contains quite a lot of tricky code which is very hardware-dependent. For most users, the BIOS is a bag of worms that is best left alone.

The BDOS, of course, like the CCP, is supplied by Digital Research and is *not* to be tampered with. The BDOS is a collection of routines which operate at a much higher level than the BIOS, to do things like renaming files, searching for files, reading sequentially from files, etc. A

complete list of the BDOS functions is given in our accompanying table.

Ignore all the more complex functions for the time being. Let's just look at console I/O: how would you write a program to copy the input to the output? The console input and output functions are numbers 1 and 2 respectively. To call CP/M's input routine, you load the function number (1) into the C register of the 8080 or Z-80, and call location 0005. This location contains a jump to the BDOS entry point. When control returns to your program, the accumulator will contain a character which has been input from the

console. The console input routine will not return to the calling program until a character has been typed.

To output that same character, move it into the E register (MOV E,A in 8080 assembler), load C with the value 2 (the function number) and call location 0005 again. When control returns to your program, the character will have been output. To complete your program, all you need is a jump back to the beginning of the program, so that the program will keep looping round, echoing its input to its output.

The basic program is shown in listing 1. If you are an experienced program designer, you can probably see at least one problem with this simple program: it will never end as it stands; it will just keep on looping around and around. A simple fix is to do a comparison with control-C and return to CP/M if the zero flag is set.

The other problem is even more obvious: the console input routine also automatically echos the input characters to the output routine. To fix it, just remove the output section of the code; it's redundant. The finished version of the program is shown in listing 2.

Getting Fancy

As an example of something a little more sophisticated, take the case of printing an error message on the console. BDOS function 9 allows outputting a string

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Postcode . . .

in one go; take a look at the listing.

At the beginning of the program, equates are used to set the ASCII values of carriage return and line feed. The program is much more readable if constants are symbolically defined in this way. The two CP/M entry points are defined at the beginning too, as well as the print string function number. Then the program really starts.

The DE register pair is used in many BDOS calls as a pointer to a block of information in memory — in this case, the block of information is the string we want to print. The program sets up DE, then

puts the print function number into C, and calls the BDOS. When it returns after printing the string, rather than returning in this example, the program exits by jumping to the CP/M warm boot entry point, which reloads the system.

Notice that the string ends with a '\$' character. This is the character that the BDOS looks for to signal the end of the string, and it is not printed.

Input/Output

The preceding examples have shown how to do simple console I/O through the BDOS. Disk I/O is much more complex,

but still done through simple steps in the same way. Here's how it works.

CP/M keeps a *directory* on the disk, which contains information about each file; its name, where it is on the disk, its length, status and so on.

Accessing a file is done in several stages. The first step is to read the directory information into memory in order to locate the file on the disk. This is called *opening* the file, and the in-memory copy of the directory entry is called a *file control block*. Once this is done, CP/M has the information it needs to read or write from or to the file.

```
; demonstration program for cpmintr2.doc  
; copies input to output
```

```
0001 =      input    equ     01          ;input function code  
0002 =      output   equ     02          ;output function code  
0005 =      bdos    equ     0005h       ;bdos jump vector  
  
0100        org     0100h       ;start at base of tpa  
  
0100 0e01    start: mvi    c,input    ;ready for input  
0102 cd0500  call    bdos  
0105 5f      mov     e,a         ;move char into e  
0106 0e02    mvi    c,output    ;ready for output  
0108 cd0500  call    bdos  
010b c30001  jmp    start      ;round and round...  
010e        end
```

```
; demonstration program for cpmintr2.doc  
; copies input to output, without echoing, and checks for `c`
```

```
0001 =      input    equ     01          ;input function code  
0002 =      output   equ     02          ;output function code  
0005 =      bdos    equ     0005h       ;bdos jump vector  
0003 =      ctrlc   equ     03          ;ascii value of `c`  
  
0100        org     0100h       ;start at base of tpa  
  
0100 0e01    start: mvi    c,input    ;ready for input  
0102 cd0500  call    bdos  
0105 5f      mov     e,a         ;move char into e  
0106 fe03    cpi    ctrlc      ;is it a `c`?  
0108 c8      r2     start      ;if it is, return to cp/m  
0109 c30001  jmp    start      ;round and round...  
010c        end
```

Listing 1 Copy input to output using BDOS functions.

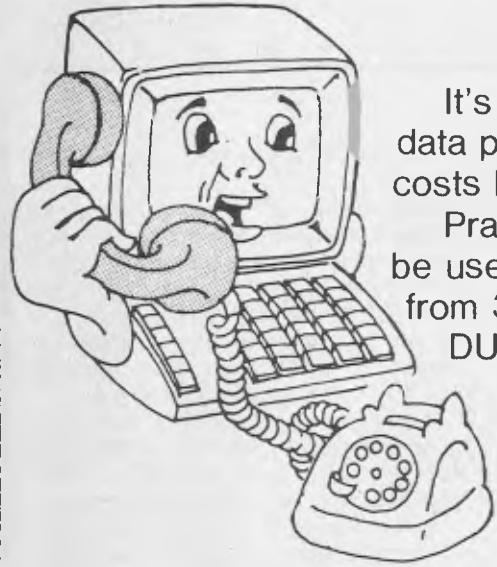
Listing 2. Cleaned-up version of listing 1.

CLOSE THE GAP

It's a fact that most data terminals are remote from the data processor. You can cut data entry delays, errors and costs by closing the gap with Sadata acoustic modems.

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Writing to a file often has the effect of making it longer; this means that the directory information is now wrong, and so when the file has been updated, it is then closed by writing the file control block (fcb) out to the directory. Reading a file does not affect the accuracy of the directory entry, and so it is not necessary to close a file that has been opened for reading only.

What's in an FCB?

As explained above, the BDOS keeps information about files in memory in a data structure called a file control block. The file control block is 36 bytes long, and contains the following information:

- Byte 0: Drive code (0 for current drive, 1 for A; 2 for B; and so on)
- 1 — 8: File name, in upper case ASCII
- 9 — 11: File type, in upper case ASCII. The most significant bits of each of the first two letters also indicates whether the file is read-only and whether it is a system file.
- 12: Current extent number, normally set to 0 by the user.
- 13, 14: Used internally, normally set to 0 by the user.
- 15: Record count for the current extent.
- 16 — 31: Used internally by CP/M.
- 32: Current record number for sequential I/O, normally initialised to 0 by the user.

33 — 35: Optional random record number in the range 0 — 65535.

All of the file access BDOS functions operate by passing the address of a file control block to the BDOS. For example, function 17, *Search for First*, will find the first directory entry that matches a wildcard filename in an fcb. So the user can initialise a fcb with the name A???????.COM and the function will load into memory the directory sector containing the first matching entry; say, ASM.COM

Listing 4 shows an example of a program that uses the BDOS disk primitives. This simple program reads in a text file, a sector at a time, and lists it to the console. In other words, it does exactly the same job as CP/M's 'type' command.

This program is run by typing 'LIST filename' (assuming it is called LIST.COM), and the CP/M console command processor will automatically set up a file control block at location 05CH, and initialises it with the name 'filename'. So when this program starts running, the file control block is initialised with the name of the file to be listed, and the program can open it straight away.

The first thing the program does is to save the stack pointer in a temporary location and replace it with its own, local stack. It then calls subroutine *open*. This sets the file record number to zero, so that it points to the beginning of the file. It then calls the BDOS open function, which will either open the file or return 255 on an error. If there is an error, the main program will print an error mes-

sage, otherwise it proceeds to set up a pointer to the end of the CP/M 128-byte buffer.

We now enter the main loop, *ploop*. This firstly tries to get the next character from the buffer. Since the buffer pointer is at the end of the buffer, there is no next character, and so the character read routine, *gnc*, will call the sector read routine *diskr*. This has the side effect of zeroing the accumulator (if there was no error or end-of-file), so that the buffer pointer now points to the beginning of the buffer again, and so the next character is returned to *loop*. If either a physical or a logical end of file is encountered, the routine returns with the carry set.

The character is saved in B while the program checks to see if a key has been struck, and then it is printed. When the end of the file is encountered, the program jumps to *done*, which prints a carriage return and line feed, and then restores the original stack before returning to the console command processor.

Although this program doesn't do much, it does illustrate the basic methods used to interface a program to CP/M. It could be the basis of a much improved 'list' program by employing a few simple modifications: for example, a counter could be set up to count the line feeds in the file, and insert a form feed character after every 66 lines. This would format the listing into pages, instead of a continuous listing, as the CP/M 'TYPE' command provides. Another improvement might be the (optional) addition of automatic line numbering.

BEGINNERS

Explaining Ourselves...

CP/M IS an operating system — that is, a program that provides input/output and disk storage and retrieval functions for microcomputers — for the 8080 family of microprocessors. The program is stored on disk and loaded into memory when the computer is powered up, and allows the user to save information in named files, catalogue disks, erase and rename files, check how much storage space is left on disks, and so on.

It also provides the standard input/output functions that programs use — which is why it is possible for programs written on one system to be transported to another. Because of this capability, a lot of software is available for computers which have CP/M.

In this article, we describe the way programs can call the CP/M functions. Last

month's article described how the operator runs CP/M. The example programs given here are written in 8080 assembly language. This is the set of instructions that the computer actually executes, and is a much more tricky language to program in than BASIC.

The BIOS referred to in the article is normally supplied by the manufacturer of the floppy disk interface or the computer, and the user would only rarely have to tamper with it.

The examples don't actually do very much, but they do demonstrate how a lot of the work can be done by CP/M. All that is required is for the main program to set up the information the right way in the microprocessor's registers, and then call CP/M. When control returns to the main program, CP/M will have output or input a

character or performed some other function.

Incidentally, CP/M now has a big brother, called MP/M, which allows several people to use a computer at one time. MP/M uses exactly the same techniques as CP/M, so that programs written for CP/M can run on the bigger system. Of course, MP/M has many extra functions, but they work in exactly the same way.

There's also a version of CP/M for computers based on the Intel 8086 16-bit microprocessor, and it uses a broadly similar technique to interface programs.

CP/M is available for many of the popular microcomputers, including the TRS-80 (although it's a modified version), the Apple (requires a Z-80 Softcard) and Heathkit systems. It's also being used by many business computer manufacturers, including Xerox and Adler. □

After a more than somewhat confusing tour through the glossary of terminology in Your Computer's first issue, understudy office idiot FRED SYMES began to wonder what had happened to good old plain English. so, armed with his twisted mind, he set about rewriting the glossary. We really didn't want to publish the result, but he forced the issue by threatening to leave and take his dictionary with him. With apologies, then, here is...

The Glossary Giggles

Array: The little bit of sunshine the beginner experiences when he finally comprehends the first page of an operating manual.

Assign: "Beware of donkeys crossing the road."

Atom: A male cat.

Binary: Modern nursery rhyme language, as in . . .

Binary, binary bed,
The mouse ran up the LED.

Byte: What your friends put on you when you win the pools.

CCP: Comic Cut Papers; descriptive of programs produced by beginners and some experts.

Chain: Made obsolete by the Daisy wheel.

Cold Boot: What you get when you kick an Eskimo.

Global: The scale of domination sought by Reagan, Brezhnev and, to a greater degree, our Mal.

Hard Disk: Definitely not for beginners.

Index: Finger for the pulling out of.

Interpreter: One is desperately needed to turn computer language into plain English.

Jump Instruction: The act of shooting at your opponent's feet.

Kilobaud: A person who knows 1000 risque stories.

LISP: Ita Buttrose, we love you.

Machine Language: HummmmmZipp-HummmmmZipp-Hummmmm.

Macro: What you set a sprat to catch.

Memory: Umm, ah, er.

MBASIC: Programme language for the Mbanga tribe in deepest Africa

Read/Write Head: A bony structure containing a brain that can't make up its own mind.

Redundant: What the publisher told me I'd be if I persisted with this nonsense.

Relocatable: Being able to find your clean socks in the same drawer twice in succession.

Resident: What you call the President after he's been to the toilet.



Numerical Analysis: Proving that $2 + 2$ really does make 5.

Operand: A South African coin specially minted for Oppenheim diamond transactions.

Operating System: What you have after a meal of prunes.

Peripheral Driver: The drunk who thinks the footpath is the F1.

PIP: What you get when your Apple malfunctions.

Polish Notation: If we told you the truth Al Grassby would sue us.

Program: In favour of metrification.

Read Only Memory: The art of conversation is dead.

Save: Impossible on my salary.

Source Language: "In the beginning . . ."

Sort: If you get on to a good one, let me know.

Symbolic Name: How about "idiot"

Teletype: The range of phones offered by Telecom for use between strikes.

Timeshare: A communal watch for poor people.

Tree: Talk to your dog about it.

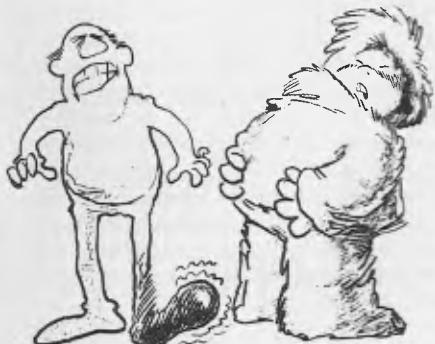
Unix: Collective noun for harem guards.

Verify: Thick upper leg.

Write Protect: Instruction to write 'protect'.

Zilog: A new character soon to appear in the Buck Rogers series.

Z80: Comic speech bubble language denoting 80 winks rather than the usual 40. □



Control Characters: Security guards at a punk rock concert.

DDT: An advanced state of alcoholism.

Double Density: The permanent state of mind of the office idiot.

Execute: Positive action required when dealing with some programmers.

FIFO: Abb. for a giant computer, as in . . .

Fe Fi Fo Fom,
Oh my God — Facom





It's a sad fact of life that software designed and written for one computer will not run on another. Apple owners have often suffered the frustration of seeing good programs written for the Z-80 microprocessor and knowing that they could not run them. LES BELL reports that those days are past since the introduction of the...

FOR HARD USERS

THE APPLE II has an enormous range of software to support it, including Pascal, FORTRAN, PILOT and a wide range of educational software from Apple alone. But the Apple is based on the MOS Technology 6502 microprocessor, and can only execute code written for that machine.

There's an enormous amount of software written for the 8080 and Z-80 microprocessors, particularly for the CP/M operating system, that Apple owners just couldn't use — until Microsoft came up with a particularly clever trick which plugs a Z-80 processor into the Apple's bus.

The Softcard comprises several components. First, there's a standard Apple-sized printed circuit card which carries a Z-80A microprocessor and a few TTL chips to support it. The board is remarkably uncomplicated, considering its function, consisting mainly of bus buffers, a few flip-flops for the clock circuitry and some address translation circuitry.

But equally important as the hardware is the software. Two disks are supplied (one in 13-sector format, one in 16-sector format for DOS 3.3 or Language Card systems). Each disk contains a copy of the CP/M operating system, with its utility programs, as well as a copy of Microsoft BASIC and a few other utilities (such as an Apple DOS-CP/M file translator). The 16-sector disk also contains a copy of an

your computer REVIEW

enhanced version of Microsoft BASIC with high-resolution graphics capabilities.

Obviously, to take advantage of the softcard you must have at least one disk drive on your system. Also, although CP/M can be installed in systems as small as 24K, the version supplied is preconfigured for a 48K Apple (although it is in fact a 44K CP/M). A 56K version is supplied on the disk for Apples which have a full 64K of RAM, either through the Language Card or Microsoft's 16K RAM card.

Installation

Installation of the Softcard is simplicity itself. It normally just plugs into slot 4 of your Apple, and that's it! When ours arrived, we flicked through the manual, shoved the card into the slot, inserted a CP/M diskette and switched on. It ran first time, naturally.

Leaving the Softcard in place will not affect the normal operation of the Apple: inserting a DOS 3.3 disk and booting brings up DOS 3.3 and the Apple behaves perfectly normally.

The first job on bringing up CP/M was to

copy the system master disk and remove it to a safe place. To do this, one must first format a blank diskette and then copy the master using the copy utility provided. The format program supplied by Microsoft worked just fine (there are two versions, one for each disk type) and we had a formatted disk within a minute or so. Similarly, the copy utility behaved just like the manual said (except it listed the copy command with the drives back-to-front in an example).

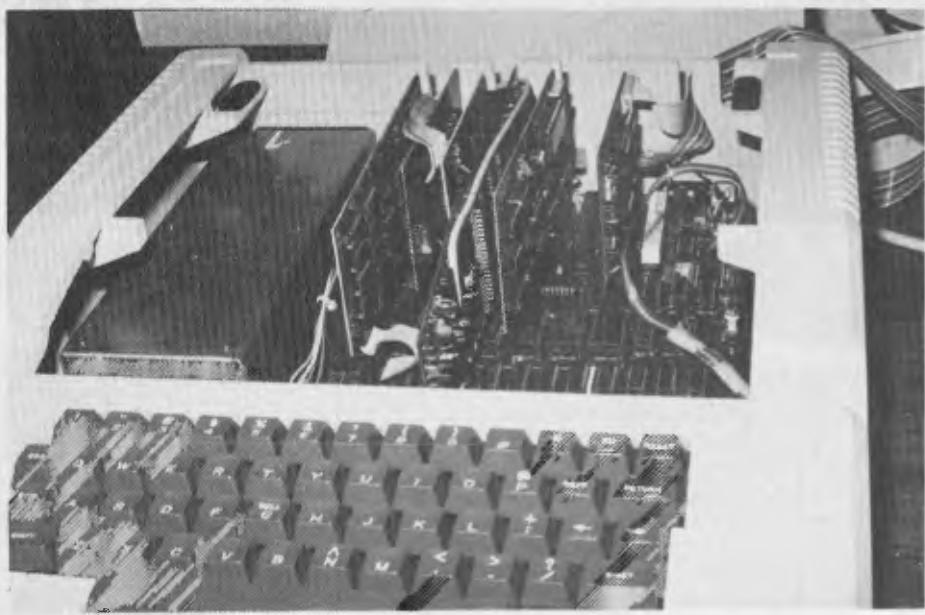
In Use

Using the Apple CP/M is no different to using any other CP/M system. On a cold boot, the screen will clear and display

Apple II/CP/M
44K vers. 2.2b
(C) 1980 MICROSOFT

and the system is up and running. Most of the standard CP/M fixtures and fittings are supplied, as covered in our Intro to CP/M last month, so we don't propose to go into them in any detail.

One annoying feature of the system is the fact that the system clears the screen on a warm boot (on returning from many CP/M programs). This can be particularly annoying when you've just used DDT to modify a program and you warm boot to get back to the CCP level before doing a



DOS VERSION 3.3
APPLE II PLUS OR ROMCARD SYSTEM MASTER

<LOADING INTEGER INTO LANGUAGE CARD>

SAVE. If you're like me, you usually do so before looking back to the top of the screen to find the DDT information which tells you how many pages to save. With Apple CP/M, of course, the screen has cleared, and I'm left scratching my head and trying to remember where the end of the program was. A small point, but damned annoying.

The BASICS

With the Softcard you also get a copy of Microsoft BASIC version 5.0, one of the most powerful BASICs around. Compared to Applesoft, MBASIC offers a number of extensions, including built-in disk I/O statements like OPEN, CLOSE, GET and PUT. This is a considerable advantage over Applesoft's kludgy PRINT Ctl-D-type patches. A CALL statement can call either Z-80 or 6502 subroutines, while CHAIN and COMMON statements will call in another BASIC program from disk and execute, passing common variables. PRINT USING allows formatted output, including comma insertion, asterisk fill, floating dollar sign and other features.

MBASIC 5.0 even has a structured feel to it, with the inclusion of WHILE and WEND statements to control conditional looping. Add to this extra string functions, use of hex and octal constants, three variable types, auto line numbering and re-

numbering, availability of a compatible compiler, user defined functions, and you can see why Microsoft BASIC is worth having in addition to Applesoft.

But that doesn't mean you give up the unique features of Applesoft. MBASIC also supports low resolution graphics, sound, cursor control and other Applesoft features. GBASIC (on the 16-sector disk) also supports all of the hi-res features except DRAW, XDRAW, SCALE and ROT.

Several software utilities are supplied with the system, including a FORMAT program, a disk copier, a program to access 13-sector CP/M files from 16-sector CP/M, and a program to transfer files from Apple DOS to CP/M. For owners of Language Cards, there's a 56K version of CP/M, and there's also a utility to allow the customization of the BIOS I/O routines (more on that later). Finally, there's a pair of programs, UPLOAD and DOWNLOAD, which allow the transfer of CP/M files from one computer to another; particularly useful since a lot of CP/M software is not yet available on Apple disks.

Peripheral compatibility

Apple CP/M makes a few assumptions about which peripherals are plugged into which slots in the Apple. For example, it assumes that the printer interface is plugged into slot 1. Slot 2 is used for the general purpose (PUN: and RDR:) I/O

A>
A>STAT *.*

Recs	Bytes	Ext Acc
13	2k	1 R/W A:APDOS.COM
64	8k	1 R/W A:ASM.COM
58	8k	1 R/W A:CONFIGIO.BAS
8	1k	1 R/W A:COPY.COM
84	11k	1 R/W A:CPM56.COM
40	5k	1 R/W A:DDT.COM
4	1k	1 R/W A:DOWNLOAD.COM
33	5k	1 R/W A:DUMP.ASM
4	1k	1 R/W A:DUMP.COM
52	7k	1 R/W A:ED.COM
18	3k	1 R/W A:FORMAT.COM
200	25k	2 R/W A:6BASIC.COM
14	2k	1 R/W A:LOAD.COM
192	24k	2 R/W A:MBASIC.COM
58	8k	1 R/W A:PIP.COM
18	3k	1 R/W A:RW13.COM
48	6k	1 R/W A:STAT.COM
10	2k	1 R/W A:SUBMIT.COM
6	1k	1 R/W A:XSUB.COM

Bytes Remaining On A: 3k

A>
A>STAT B:.*

Recs	Bytes	Ext Acc
26	4k	1 R/W B:2CPRNT.WPM
28	4k	1 R/W B:ALPHA.WPM
264	33k	3 R/W B:APIOS.ASM
95	12k	1 R/W B:APIOS.HEX
46	6k	1 R/W B:APPLE.DOC
170	22k	2 R/W B:APPLESB.COM
7	1k	1 R/W B:BATCH.WPM
5	1k	1 R/W B:BOILER.1
1	1k	1 R/W B:BOILER.LET
4	1k	1 R/W B:BOILER.WPM
6	1k	1 R/W B:COMMAND.HEP
21	3k	1 R/W B:CUESORT.WPM
9	2k	1 R/W B:DISK.HEP
6	1k	1 R/W B:EDIT.HEP
6	1k	1 R/W B:FORM.1
11	2k	1 R/W B:FORMAT.HEP
9	2k	1 R/W B:FDRMS.WPM
3	1k	1 R/W B:HE.HEP
4	1k	1 R/W B:LETTER
13	2k	1 R/W B:LINENB.WPM
7	1k	1 R/W B:MMERGE.DEM
14	2k	1 R/W B:MMERGE.WPM
3	1k	1 R/W B:NAMES
5	1k	1 R/W B:PRINT.HEP
8	1k	1 R/W B:QF.DEM
7	1k	1 R/W B:SPACE.TAB
7	1k	1 R/W B:ZIPSORT.WPM

Bytes Remaining On B: 17k

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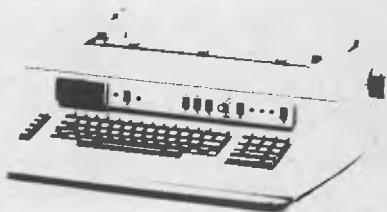
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devices and slot 3 for the console output device, if one is present (otherwise the Apple 24 × 40 screen is used). We used the softcard with a Zofarry 80 × 24 video card, and it worked perfectly from first boot. Generally, CP/M will work with any card that will work with Apple Pascal.

I/O is done by switching from the Z-80 processor to the Apple's own 6502, which can then execute the code in the I/O card ROM. The software aspects of the I/O are fairly complex, using a table-driven technique similar to CP/M 2.0's disk handling. An I/O configuration block contains the information necessary to interface CP/M to the various hardware and software configurations possible on the Apple. It's five primary functions are: a. console cursor addressing and other screen functions; b. redefinition of keyboard characters; c. support of non-standard peripherals and software; d. calling of 6502 subroutines; and e. indication of the presence and location of peripheral cards.

For example, the Apple screen responds to 'Datamedia' terminal control sequences, but very few CP/M programs use them. The I/O configuration block contains a table which translates the CP/M control sequences into Datamedia codes. To customise this table, you would use a BASIC program called CONFIGIO, which prompts and guides the user through the process of setting up the table. CONFIGIO also allows the user to

```
DIR
A: FORMAT COM : COPY      COM : MBASIC   COM : PIP      COM
A: STAT    COM : ED       COM : DDT      COM : LOAD    COM
A: APDOS   COM : SUBMIT   COM : XSUB     COM : DUMP    COM
A: DOWNLOAD COM : APCON   BAS : APCON    BAS
A>STAT
A: R/W, Space: 61k
```

A>STAT .:.

Recs	Bytes	Ext Acc
8	1k	1 R/W A:APCON.BAS
4	1k	1 R/W A:APCON.DOC
13	2k	1 R/W A:APDOS.COM
8	1k	1 R/W A:COPY.COM
40	5k	1 R/W A:DDT.COM
4	1k	1 R/W A:DOWNLOAD.COM
3	1k	1 R/W A:DUMP.COM
52	7k	1 R/W A:ED.COM
18	3k	1 R/W A:FORMAT.COM
14	2k	1 R/W A:LOAD.COM
192	24k	2 R/W A:MBASIC.COM
58	8k	1 R/W A:PIP.COM
48	6k	1 R/W A:STAT.COM
10	2k	1 R/W A:SUBMIT.COM
6	1k	1 R/W A:XSUB.COM

Bytes Remaining On A: 61k

A>C

```
56X Ver. 2.288
(C) 1988 Microsoft

A>DIR
A: FORMAT COM : COPY      COM : MBASIC   COM : BASIC   COM
A: CONFIGIO BAS : PIP      COM : STRT    COM : ED      COM
A: RSM    COM : DOT      COM : LOAD    COM : RAM3    COM
A: APDOS   COM : SUBMIT   COM : XSUB     COM : DUMP    COM
A: DUMP   COM : DOWNLOAD COM : CPHS6    COM
A>DIR B:
B: APPLESB COM : APIDS   RSM : APIDS   HEX : LINENS  WPM
B: MMERGE WPM : CUESORT WPM : SPRINT WPM : FORMS  WPM
B: BATCH  WPM : ZIPSORT WPM : BOLLER WPM : RUPHR  WPM
B: OF    DEM : MERGE  DEM : LETTER  LET : NAMES   HEP
B: FORM   I : BOLLER   I : BOLLER  LET : EDIT    HEP
B: COMMAND HEP : DISK   HEP : FORMAT  HEP : PRINT   HEP
B: ME    HEP : SPACE   TRB : APPLE    DOC
A>R/W, Space: 3k
B>R/W, Space: 17k
```

```
BASIC-80 Rev. 5.2
[Apple CP/M Version]
Copyright (C) 1988 by Microsoft
Created: 12-Nov-88
26483 Bytes free
```

Ok

BEGINNERS

Why Softcard

NO, IT'S NO different to a normal printed circuit board... it doesn't bend and stretch. Softcard is just a nice name for a plug-in card that adds a new dimension to the Apple.

The Softcard is virtually a computer on its own, though without the necessary memory and associated bits to operate by itself. It uses instead the Apple's own internals to allow it to run.

While it is being used, it replaces the Apple's own microprocessor as the central 'brain'.

Why switch between different microprocessors? Don't they both do the same thing? They do do the same thing, but they do it in different ways — and neither is capable of understanding or operating on commands meant for the other.

That's quite normal, and won't bother most Apple owners because there is a huge range of software written to suit its 6502 microprocessor. But most computer buffs are greedy — there's always some feature of someone else's system they would like to have on their own.

And the features available to users of

the Z-80 microprocessor — which forms the basis of most hobby systems, many business computers and machines like the TRS-80, Sorcerer and even Sinclair's ZX80 — are among the most coveted.

The Softcard, then, gives the Apple an unusual versatility by allowing it to run both its standard software and material designed to run with the Z-80 under the operating system called CP/M (Control Program for Microprocessors).

This operating system is the most popular in the world of micros today, so there is an incredible range of programs written for it — as long as you can get them onto the Apple 5½ inch disks (CP/M standard is 8 inch) you're off and running.

It's not hard work to swap between the two microprocessors: you just insert the particular system disk you want and start your machine. The rest is automatic. Similarly, installation is easy and once you have the Softcard in your machine you'll never know it's there until you call on it.

The card allows the Z-80 microprocessor to control its fellow "brain" in the Apple, using it to get at the normal on-board memory and Input/Output ports.

What you Get

When you lay down the money required for a Softcard you walk away with a heavy, tightly packed box, most of which is manuals. The system is heavily documented — both in quantity and style. Unfortunately the CP/M system documentation won't make the best-seller lists; it is as complicated for the beginner as it is extensive.

The card itself is the easy part; it just slips into a vacant slot inside the Apple with no fuss or bother.

You also get two system master disks, one each for Apple's two common but incompatible disk control systems. Included on these is the CP/M system, along with utilities that aid a variety of common functions such as copying disks, finding the space available on disks, transferring files, and so on.

Once you start playing around with this system, you may never want to go back to the effective-but-limited standard Apple operation. Fortunately, one of the utilities is a program for converting Apple files to CP/M files.

patch in custom I/O routines, and space is reserved in the CBIOS for these routines.

I'm used to systems where the source code for the CBIOS is supplied on the system disk, and initially felt a bit paranoid about not being able to fully customise the CBIOS for the Apple. However, Microsoft has written the CBIOS in a modular fashion, and tried to anticipate the needs of most users, so that the CONFIGIO program will solve most problems.

Documentation

The documentation for the Softcard is pretty good overall. It's attractively presented in two padded binders, and is a convenient size to match the other Apple manuals. Volume 1 introduces the system, gives details of installation procedures and details the software and hardware.

The largest part of the first volume is a reprint of the Digital Research CP/M manuals. Now, the CP/M manuals are renowned for their indigestibility, but fortunately Microsoft has included a simple introduction to CP/M which gets the novice up and running before the manuals defeat him. The main CP/M manuals, however, have been only cursorily edited — even the first sentence contains a howler!

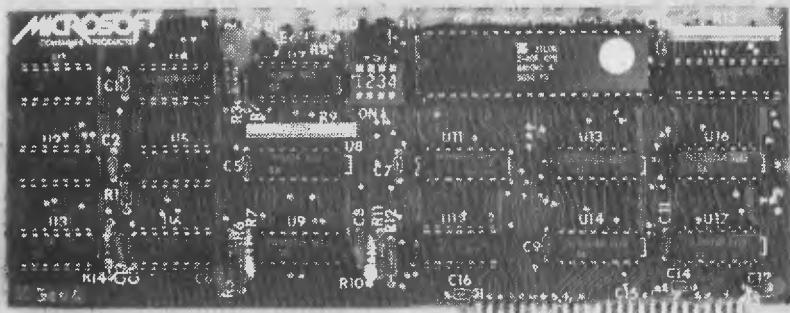
I quote: "CP/M is a monitor control program for microcomputer system development which uses IBM-compatible flexible disks for backup storage." Not in a pink fit could I agree that Apple disks are IBM compatible — IBM doesn't yet have a standard for minifloppies!

Volume 2 is given over to explaining the intricacies of Microsoft BASIC. This is mostly a rehash of Microsoft's previous manuals for MBASIC, and is extremely comprehensive with lots of short examples. Particular attention is given to disk I/O, including some example programs, notably a simple inventory program. Finally, a short section describes the software utilities supplied with the system.

Overall

The softcard is a well conceived and executed product. Although there's only a limited amount of CP/M-compatible software available on Apple disks, new products appear every day. The major limitation of the system is the small amount of storage on each disk: 128 Kbytes is barely enough to hold the operating system with a few utilities like STAT and PIP. Two disk drives are virtually a necessity. At a price of around \$400, the Softcard represents excellent value — particularly when you consider the worth of the software alone.

As a long-time CP/M user and devotee, I reckon it makes the Apple just about bearable, but many Apple owners, free of my prejudices, seem to reckon it's worthwhile also! □



Specifications and Report Card

Unit:	Z-80 Softcard
Made By:	Microsoft Consumer Products, USA
Processor:	Zilog Z-80
Clock Speed:	2.041 MHz
RAM:	None on board. Maps Apple RAM into Z-80 address space
ROM:	None on board
I/O:	Apple peripheral slots
Languages:	Microsoft BASIC (modified to support Apple graphics and hardware), other CP/M compatible languages like CBASIC, FORTH, C, Pascal
Disk Capacity:	128 Kbytes, plus system tracks (16-sector disks)
Keyboard:	Standard Apple
Graphics:	Standard Apple graphics included in MBASIC plus hi-res HGR with GBASIC for DOS 3.3 users
Peripherals:	Supports Apple peripherals
Expansion:	Compatible with Apple Language card or Microsoft RAMcard to upgrade Apple to 64K
Best points:	Superior operating system, wide range of CP/M software.
Worst points:	Screen clearing after warm boot.

Ratings:	excellent	good	well, maybe	poor
Documentation:		✓		
Ease of Use:		✓		
Functionality:	✓			
Support:		✓		
Value-for-money:	✓			
Extras included:	Not applicable			
Options:	Microsoft languages, limited software			
Price:	\$395			
Review unit from:	City Personal Computers			



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REVIEW**

Fond memories of Boys' Own Annuals? Fleeting visions of Flash Gordon? Worried because chess is chess and crosswords always have the answer the next day?

CHRIS CAROLAN was lured to review a cunning piece of computer game software. So cunning it has him hooked on the game and all games like it...

BEWARE THE CAVE DEMONS

IF YOU haven't played Adventure you haven't lived. No computer shop will openly admit this, but more home computers have been sold because the buyer was given a demo of an Adventure game than for any other single reason.

Exaggerated? Of course it is. But Adventure games do that to you and a lot of people do buy home computers because they've become hooked on finding out what the magic lantern does in the pit when mixed with a packet of salt. That's Adventure; programs which can run on most of the popular makes. It's a style of game that requires cunning, intelligence, perseverance, tenacity and courage. We jest not, you'll never be happy being a Master Class B, you'll want to become a Class A.

"You are standing somewhere..."
"There is nothing to be seen..."
"What shall I do?..."

If you have seen or played one of the many Adventure games, then phrases like those will be familiar to you. The gen-

eral concept of an Adventure is this: the computer describes where you are, what it can see, and maybe where it is possible to go. By using one or two-word commands, you have to tell the computer what you want it to do, on your behalf. Some of the more sophisticated versions pop pictures on the computer's screen.

As you direct your travels through the rooms or passages (how? More on that in a minute), you will undoubtedly come across items of use or value, or maybe both. Uses of these objects may not be immediately apparent — there is often a certain amount of magic employed in these games and therefore the objects may have powers which are not immediately obvious. Only when you come across some insurmountable obstacle does one of these seemingly useless items prove its worth, enabling you to make the problem disappear.

Not all the items are so obscure in their use, however. If you find a key, then it's fair to assume at some stage it will be necessary to unlock something. Or maybe you have already found a use for it

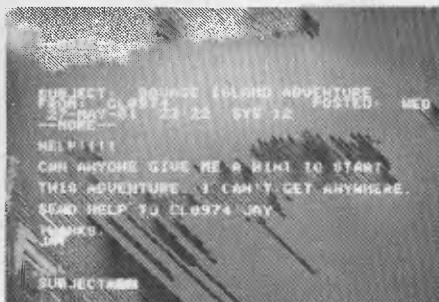




(that locked door five or so moves back!). Take note — if you cannot see how to solve a problem, leave it for a while. You will, probably, find a clue somewhere else.

There is a similarity between these games and crosswords. Looking for the answer can be frustrating, and sometimes very pedestrian. However, once the solution has been found there is usually enough of a link between the clues to make you say "Well, why didn't I think of that before? On the other hand, there are also times when the problem and solution bear little or no relation to any logic.

This parallel has a slight disparity in it, though. While the words in a crossword are all documented (in the dictionary), the vocabulary understood by these games is usually quite limited. Hence one of the first obstacles to overcome is: "What words does this game recognise?" Because of the limits on space in the memory, typically only the first three or four characters of a word are stored by the program and although this may sound like it limits the number of possibilities, it sometimes makes it a little harder to work out what is understood by a shortened word. For this reason it is better to restrict the words you try to 3,4 or 5 letters to keep the ambiguity to a minimum.



Timmberrr!

Words also fall into categories. Two different words can have the same affect. Movement is usually explained in the instructions which, hopefully, accompany the game. Manipulation of items found or seen is perhaps not so well explained. It is sometimes possible to discover more about an object by using words like OPEN, EXAM(ine), and READ. To pick up an object use words like PICK, GET and TAKE. To drop it use DROP, PUT, THRO(w) and RELE(ase). In some cases, in order to make use of the magic power of an item it is only necessary to drop it at the right location. To make up an example: if I found (and picked up) a tin (which I have tried to READ, OPEN, WAVE, UNDO, UNLOCK, etc) and I came across a beggar who won't let me pass, I say DROP TIN. The beggar produces a tin opener, undoes the tin and the resultant flame shrivels him up to nothing — the tin has



done its work without you having to know anything special.

Be warned that if I had managed to open the tin, the same thing might have happened to me — many items may have a good and a bad use. Also, make sure that you use the word which is in the description of the object. If you are told that "There is a Brass Lantern here", then GET LAMP or GET LIGHT may not work. GET BRASS almost certainly will not, but GET LANTERN will.

After your first few exploratory ventures into any game, it is a good idea to make a map or diagram of the locations, their connection, the items you find there, and maybe even some notes on how to overcome the obstacles. A diagram is probably more sensible, as a map tends to give the idea that directions (N,S,E,W,) reflect the real world and you will find that it is impossible to make any real sense of what you draw in most cases. When you eventually get into the farther reaches of the game, then it is useful to know how to get there with the minimum of fuss; in some games it is necessary to achieve the result within a certain time (or more likely a certain number of moves), so a knowledge of the short cuts can be important. And if you come back to the game after a break (often a good idea if you can't solve a problem) you won't have to strain the memory trying to remember how to find a certain item or place.

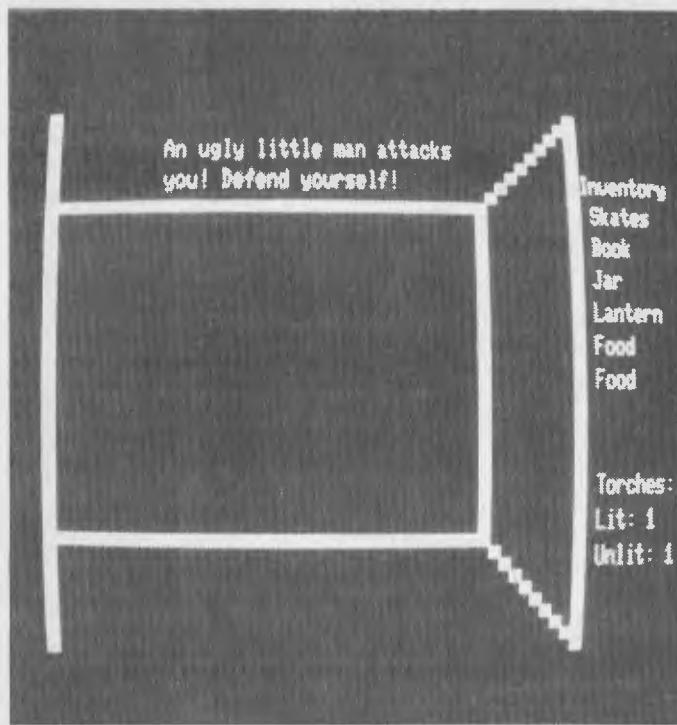
So, having given a few hints on the whys and wherefores of this type of game and without giving away any secrets, here is a brief description of what is in store for you if you should attempt the following games. Since they require a certain

amount of dedication, time and effort to get the final solution, I am not going to tell you how far I got . . .

Good, Bad And Ugly

One of the most difficult things to decide about any game is what makes it good or bad, enjoyable or boring. Different things appeal to different people. I'm sure John Sands has spent many an hour puzzling over this very question.

When it comes to computer adventure games, I think the most important factor in determining this is, "How intelligent are the game's responses?" The more varied and entertaining the replies are, the more enjoyment I get when playing any game. If you use words that you know are understood, then I think it is only fair to expect a reasonable answer to your command. If, for instance, you try to feed an animal you come across, and the reply is "That Is Not Possible", (the same reply as when you tried to open the door without the key, or kill the man without the gun, and so on) then it is very easy to become disenchanted with the game. If, however, the animal eats the food, or the animal is not hungry, or the animal wants to eat you then the reply is far more realistic and entertaining. Similarly, if you try to unlock the door and you are told that you haven't got the key, then the same applies. The other main point here is the logical relationship of the problem to the solution. If you get attacked by a bee, it is more probable that you have to find a swat, or honey, or a container with honey, or a can of fly-spray, than having to scare it away by exploding a box of dynamite.



Labyrinth

A 3-D perspective game where you direct your way through a maze of some description. The maze does not lend itself to a simple mapping technique as there are areas where the real world seems to take a bit of a beating. However, a map is a necessity as it is extremely easy to get lost and as there are no real distinguishing marks anywhere. Many passages bear a striking resemblance to each other. It is also easy to get killed; the dangers give no warning of their presence until you step into the square, whereupon there is no chance of escape unless you know how to dispose of the threat. This is not very obvious and can be very annoying trying to find the method when each time it fails you are thrown back to the start of the game. This is why a map is a must. To be able to find your way back to the difficult areas without getting killed in the process. The ultimate object of the game is to destroy the minotaur who lurks in the maze. If at any stage of the game you run out of light, then he is quick to devour you, and you have no way of stopping it.

I found that after a few hours deeply engrossed in watching where I was going on the screen (and you really do have to be careful) I developed a headache from the movement of the 3D images.

The graphics take a bit of getting used to but, once understood, pose no problem. In fact, you can even remember some parts of the maze by sight — "I've been here before" may well become a standard cry! Apart from the unseen dangers of the various nasties which attack

you, there are also pits which you can fall down, but these are not necessarily fatal, as the instructions kindly tell you. They just make it damn near impossible to know where you are.

Having made a half-reasonable map, you should be able to tackle the real job in hand, that of disposing of the nasties, each of whom hides a piece of equipment necessary for the next or ultimate conflict.

... KILL MINO (taur)!

He hacks you to bits!

*You are another victim of the maze!
Do you want to play another game (Y or N)?*

Games Software Report Card				
Program:	Labyrinth			
Made By:	Med Systems Software, USA			
Available for:	TRS-80 Model I and III, System 80			
Ratings:	excellent	good	okay	well, maybe
Ease of Use	✓			
Speed	✓			
Entertainment value	✓			
Educational value	✓			
Documentation	✓			
Value-for-money	✓			
Holds interest for:	a long time if you're the persistent type			
Price:	\$15.95			
Review copy from:	Compshop Australia, Sth Melbourne			



Pyramid of Doom

THE MAIN object is to find 100 treasures inside a pyramid. These treasures are guarded by various monsters and it is very amusing sometimes (especially when you do the wrong thing with one of your hard-earned items). Amusing to the point of tearing your hair out, in fact. The screen is split into two areas; the top part giving a description of where you are, what can be seen, and some exits from where you are. The bottom half is the area where you enter the required commands, and replies are given. This area is scrolled while the top part remains static (until you pick something up, when the visible item list is changed). Vocabulary is reasonable, and it is used well. There is a reply for most of the things you try to do. There are also a variety of "I Don't Understand" messages. You get tired of hearing the same thing over and over and over again. Solutions to the problems seem to be

related in a fairly logical way, although there are some that I haven't found yet. Some of the earlier games in the series apparently make life a lot easier, so it might be better to start at the bottom and work up to this one. As with a lot of the games a hint book is available. I see that as the easy way out, and it rather destroys the point of the game in the first place. Overall, this seems to be a game where you can spend time thinking about solutions to the problems, rather than having to start again after a mishap. Clues are not abundant, but there is enough to keep you busy for a while.



```
IN A FACKY ENTRANCE-WAY. VISIBLE
ITEMS:
CLOSED SARCOPHAGUS. MOLDY BANDAGES.
OPEN DOOR. PISTOL.
SOME EXITS ARE: NORTH SOUTH
I hear strange noises!
The sound of machinery.
--> WHAT SHALL I DO? U
OK
--> WHAT SHALL I DO? READ SIGN
SIGN: He who defiles the tombs of Egypt
shall surely perish!
--> WHAT SHALL I DO? GET STONE
The sound of machinery.
--> WHAT SHALL I DO? OPEN DOOR
--> WHAT SHALL I DO? LIGHT FLASHLITE
I DON'T KNOW HOW TO "IN" SOMETHING.
--> WHAT SHALL I DO? ENTER DOOR
--> WHAT SHALL I DO? LIGHT FLASHLITE
```

Games Software Report Card

Program:	Pyramid of Doom			
Made By:	Adventure International, USA			
Available for:	Most popular micros			
Ratings:	excellent	good	okay	well, maybe
Ease of Use			✓	
Speed		✓		
Entertainment value			✓	
Educational value				✓
Documentation				✓
Value-for-money	✓			
Holds interest for:	Several hours			
Price:	\$19.50			
Review copy from:	Compshop Australia, St Melbourne			

Microsoft Adventure — The Big One

THIS ADVENTURE is a full-blown copy of the original PDP-10 Adventure, and is still the best we've seen.

It makes no claims to hundreds of treasures to be found, or thousands of locations to explore, so to the uninitiated it could at first be written off as a smaller version of some other adventures about currently. On the contrary, it is actually one of the most absorbing and interesting available.

Perhaps the best thing about this game is its extensive vocabulary — you don't have to spend an hour discovering the few words it recognises. It even has a cute reply for at least one of the common four-letter words you're likely to use on it in a moment of frustration.

The unusually comprehensive messages and replies cannot, unfortunately, be had for a small-memory machine, and Adventure is only available for computers equipped with disk drives. It is disk-based throughout — it accesses the disk for information or a reply each time you make a move.

Nevertheless it all happens quickly enough, unless you've first played it on a hard-disk machine where it is faster again.

The goal is to reach 350 points by exploring the "Colossal Cave" system. As the very good instruction booklet explains, there are various 'experience levels' to the cave system, and as you reach each one your score increases. Points are also awarded for collecting the 15 treasures in the major part of the game.

Having found these treasures and returned them to the building (easier said than done, naturally), you can continue exploring the caves in the hope of being offered a chance at the Grand-Master game — an extra challenge just when you thought you had it conquered!

Mapping is a must but, like so many games of this sort, don't try to make things look too much like the real world (especially when you map the two mazes).

If you get stuck on one of the obstacles there are always other areas to be explored (unless it's your last treasure; then you'll just have to think about it!) — come back to your problem area later and it might be easily solved.

If you spend a lot of moves trying to get around an obstacle you are occasionally offered a hint; accepting it costs you points, but at least you will know the answer on your next journey through the cave system.

So far, this definitely rates as the most absorbing adventure we have tried, although different things will appeal to different people. It can be just as frustrating as many others.

It certainly is one of the best value-for-money games available — our office copy has been booted more often than anything but our word processing disks. At least one *Your Computer* writer has been playing it since last year and still hasn't reached the end, while the more dedicated of us who have sat up through the night mapping and experimenting are getting closer.

We have one Grand Master, one Adventurer Grade A, one Adventurer Grade C, two Seasoned Adventurers, a Novice — and the Office Idiot, who still hasn't figured out how to put a disk into a disk drive, so he can't play... □



THE SEPULCHRAL VOICE ENTONES: "THE CAVE IS NOW CLOSED AS THE ECHOES FADE, AND THERE IS A BLINDING FLASH OF LIGHT (AND A SMALL PUFF OF ORANGE SMOKE). AS YOUR EYES REFOCUS, YOU LOOK AROUND AND FIND...

YOU ARE AT THE NORTHEAST END OF AN IMMENSE ROOM. EVEN LARGER THAN THE GIANT ROOM IT APPEARS TO BE, A REPOSITORY FOR THE "ADVENTURE" PROGRAM MASSIVE TORCHES FAR OVERHEAD BATHE THE ROOM WITH SMOKY YELLOW LIGHT SCATTERED ABOUT YOU CAN BE SEEN A PILE OF BOTTLES (ALL OF THEM EMPTY), A NURSERY OF YOUNG BEANSTALKS MURMURING QUIETLY, A BED OF OYSTERS, A BUNDLE OF BLACK RODS WITH RUSTY STARS ON THEIR ENDS, AND A COLLECTION OF BRASS LANTERNS OFF TO ONE SIDE A GREAT MANY DWARVES ARE SLEEPING ON THE FLOOR."

* * MORE * * (HIT 'RETURN')

Games Software Report Card

Program:	Adventure			
Made By:	Microsoft Consumer Products Inc, USA			
Available for:	disk drive Apple, TRS-80, System 80			
Ratings:	excellent	good	okay	well, maybe
Ease of Use		✓		
Speed			✓	
Entertainment value		✓		
Educational value				✓
Documentation			✓	
Value-for-money		✓		
Holds interest for:	Ages, depending on how smart you are and how often you can stay awake until dawn			
Price:	\$34.95			
Review copy from:	Seahorse Computers, Camden			

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If you want further information on the Adventure games, or other software, you can contact Compshop at 75 Palmerston Crescent, South Melbourne; or Phone (03) 690 5336

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3. How many Adventures are there in the series
4. If you can't find your way around an Adventure problem, what should you do?

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YC/8/81

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Applesoft Word Checker

IT SEEMS many people have played "word games" before coming across our recent competition, which boasts an APF Imagination Machine as its prize. We say that because those "experienced" in such games generally got ours all wrong!

Up to 25 percent of the entries took the wrong approach, trying to make up as many words as possible out of the letters used in the title — but using each letter as many times as they liked.

The rules said quite clearly that each could be used only once: some just assumed ours was like other competitions they had been involved in, and charged off in the wrong direction.

We'll know next month who won the machine, and how, but meanwhile we'll try to ensure that it wasn't a total waste of time for the mistaken entrants by publishing this program. It's a "word checker" written in Applesoft and designed to check and store words that comply with the (misinterpreted) rules.

If nothing else, it could prove valuable in those other word competitions...

It was sent in from Peter Jarvis, of Hornsby NSW. □

```
5 REM WORD CHECKER IN 'APPLESOFT' BASIC
6 REM FOR WORDS EXTRACTED FROM: - 'APP IMAGINATION MACHINE'
10 A$ = CHR$(4)
15 DIM W$(1000)
20 DIM A(12),B$(12)
30 A$ = "APPIMAGINTOCH": REM THE LETTERS
40 B$ = "411421311111": REM THE OCCURENCES
50 FOR T = 1 TO 12: REM THE NO. OF LETTERS AVAILABLE
60 A$(T) = MID$(A$,T,1): REM STORE EACH LETTER IN ONE ARRAY ELEMENT
70 A(T) = VAL(MID$(B$,T,1))
75 NEXT T
100 INPUT "ENTER WORD (OR 'SAVE')":W$
102 IF W$ = "SAVE" THEN 2000
105 L = LEN(W$)
110 FOR K = 1 TO 12
112 FOR J = 1 TO L
120 IF MID$(W$,J,1) = A$(K) THEN A(K) = A(K) - 1:CT = CT + 1
130 IF A(K) < 0 THEN 500: REM WORD NOT GOOD
140 NEXT J
145 NEXT K
150 IF CT < L THEN 500: REM SOME LETTERS IN WORD NOT USED
155 GOSUB 600: REM WORD OK PREPARE TO STORE IT
170 REM RESTORE A(N)
175 FOR T = 1 TO 12
180 A(T) = VAL(MID$(B$,T,1))
190 NEXT T
200 CT = 0
210 GOTO 100
500 REM ADVISE WORD NOT GOOD
510 PRINT CHR$(7)
520 PRINT "WORD NOT ACCEPTABLE"
530 GOTO 170
600 REM STORE WORD, BUT SEE IF ALREADY STORED FIRST
610 FOR M = 1 TO CN
620 IF W$ = W$(M) THEN PRINT "WORD ALREADY STORED": RETURN
630 NEXT M
640 CN = CN + 1
650 W$(CN) = W$
660 PRINT "WORD STORED"
670 RETURN
2000 PRINT "OPEN WORDFILE"
2010 PRINT "D$": "WRITE WORDFILE"
2020 FOR M = 1 TO CN
2030 PRINT W$(M)
2040 NEXT M
2050 PRINT "#": "CLOSE"
2070 PRINT "WORD STORED IN WORDFILE"
2080 PRINT "FILE CLEARED, PROGRAM STOPPED"
2090 END
```

Apcon File Converter

APCON was written to solve a specific problem with the installation of the soft-card in an Apple. Conversion of Applesoft text files revealed that the files often included carriage returns but no line feeds, making it impossible to list such files to the screen. Obviously a program was needed to fix those files. Well, here it is.

Apcon is an example of a class of programs known as *filters*. Their function is generally to accept a stream of data as input, process it in some simple way, and produce a modified form of the data as output. All that Apcon does is to read the input file a line at a time, and output it to the output file. Microsoft BASIC automatically outputs a line feed at the end of each line, so that's all the processing required.

A couple of options have been added to the basic program: it now prints a directory of both disk drives if requested, and will list the file to the console if no output file is specified.

Operation program is absolutely straightforward.

5 PRINT "APCON - APPLESOFT TEXT FILE TO CP/M CONVERTER"

```
100 INPUT "DO YOU WANT INSTRUCTIONS (Y/N)":A$
110 IF LEFT$(A$,1)="Y" THEN GOSUB 390
120 INPUT "FILE TO PROCESS (<CR> TO LIST FILES)": I$
130 IF I$("") THEN GOTO 190
140 PRINT: PRINT "FILES ON A:"
150 FILES
160 PRINT: PRINT "FILES ON B:"
170 FILES "B:$."
180 PRINT: GOTO 120
190 INPUT "WRITE TO FILE (<CR> FOR CON:)":OF$
200 PRINT
210 IF OF$="" THEN 310
220 OPEN "I",#1,I$
230 OPEN "O",#2,OF$
240 IF EOF(1) THEN 280
250 LINE INPUT #1,B$
260 PRINT #2,B$
270 GOTO 240
280 CLOSE #1
290 CLOSE #2
300 GOTO 370
310 OPEN "I",#1,I$
```

```

320 IF EDF(1) THEN 360
330 LINE INPUT #1,B$
340 PRINT B$
350 GOTO 320
360 CLOSE #1
370 PRINT: INPUT "ANOTHER (Y/N)";A$
380 IF LEFT$(A$,1)<>"Y" THEN SYSTEM ELSE GOTO 120
390 PRINT
400 PRINT "APCON INSERTS LINE FEEDS WHERE REQUIRED AFTER CARRIAGE RETURNS"
410 PRINT "TO FIND OUT NAMES OF FILES, JUST HIT <CR> FOR INPUT FILE"
420 PRINT "TO LIST FILE TO CONSOLE, TYPE <CR> FOR OUTPUT FILE"
430 PRINT
440 RETURN

```

A>

WIZ

THE SORCERER is one of the most advanced computers available to the home computer market. Much has been said about the Sorcerer's superior graphics so for a change I will talk about something to enhance the graphic power of the computer.

Most Sorcerer owners will know that by monitoring bit 0 of the parallel port a new world opens up when playing games. This is because most programmers use this bit for sound effects. In this article I will present a sound-effect generator. ((Note: sound-effect not music.)

For convenience I have interfaced it with BASIC to make it accessible to BASIC programs. The machine code program listed below must first be entered, it resides from 0000 to 0030 HEX. After entering the program you must re-enter BASIC by typing PP.

To make the sound-effect generator available to BASIC you must type POKE 262,199, sound-effects can now be generated and heard if an amplifier is connected to bit 0 of the port.

To generate a sound-effect you use the OUT command of BASIC.
For example: 10 OUT 120,30

This will give a sound of tone 120 and of duration 30. Thus OUT 255,255 is the longest, lowest sound that can be produced. And OUT 1,1 is the highest, shortest sound.

This method of sound production is extremely fast even when used through BASIC and if you type in the BASIC program listed below you will hear the sort of way-out sounds that can be produced.

The BASIC program is only the tip of the iceberg with only six patterns generated. There are more than 65,000 possible

002C: D1	POP DE
002D: C1	POP BC
002E: F1	POP AF
002F: C1	POP BC
0030: C9	RET
0031: 00	NOP
0032: 00	NOP

D O N E

INSTRUCTIONS:	30
BYTES:	51

SORCERER LISTING 2

```

0 PRINTCHR$(12)
10 POKE262,199
20 PRINT"ROUTINE 1"
30 FORI=255TO1STEP-1
40 OUTI,5
50 NEXT
60 :
70 PRINT"ROUTINE 2"
80 FORI=250TO1STEP-10
90 OUT20,I
100 OUT10,I
110 NEXT
120 :
130 PRINT"ROUTINE 3"
140 FORI=255TO1STEP-1
150 OUT5,I
160 NEXT
170 :
180 PRINT"ROUTINE 4"
190 FORI=1TO100
200 OUT50*RND(1)+1,20
210 NEXT
220 :
230 PRINT"ROUTINE 5"
240 FORI=100TO1STEP-5
250 FORJ=1TO1
260 OUTJ,5
270 NEXT
280 FORJ=1TO1STEP-1
290 OUTJ,5
300 NEXTJ,I
310 :
320 PRINT"ROUTINE 6"
330 FORJ=1TO90
340 FORI=10TO100STEPJ+2
350 OUTI,5
360 NEXTI,J
370 RUN

```

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MORE POWER for the APPLE

CYBERNETICS RESEARCH is pleased to announce the release of
GRAFPAK 1.0 FOR 48K APPLE II

The first major enhancement to APPLE Basic since APPLESOFT!

GRAFPAK is an Australian software package from CYBERNETICS RESEARCH which extends the power of APPLESOFT for the programmer and computer hobbyist. Designed as a 1.5 boot program GRAFPAK extends the range of BASIC commands to give you the power and features normally only available to experienced assembler programmers or users of far more sophisticated hardware.

There are 30 new commands in GRAFPAK which fall into five categories

1. Screen Handling

- 12 New commands allowing FULL graphics/text intermixing with OVERWRITE, OR, XOR

- 2. Tape commands now available with DOS-STORE, RECALL and SHLOAD with DOS.
- 3. PAINT USING from Basic
 - Print Using with COBOL, picture formatting, Zero suppression, decimal point alignment, floating dollar signs, etc.
- 4. ENHANCED APPLESOFT commands
 - Fast GOTO and GOSUB with up to 40% faster execution times.
 - DYNAMIC redimensioning of arrays.
 - ONERR fix
 - RESTORE to line number
 - 16 bit PEEK, POKE Addressing
 - Input strings with leading blanks, commas and colons preserved.
- 5. Miscellaneous Commands and Utilities
 - Sorting Alpha string arrays
 - Music routine emulating the One on Programmers Aid.

- Demonstration programs
- Enhanced disk control with direct RWTS access!
- Graphics utilities including
 - o Shape Maker
 - o Examin/Alter character set including lower case
 - o Function Plotter

GRAFPAK is a cheap but powerful extension to APPLESOFT BASIC. It also enables you to utilise features of your APPLE II computer previously unavailable with current software. GRAFPAK has had a great deal of work put into it and at \$95. recommended retail it represents great value for professional and amateur programmer alike.

It can be obtained from the manufacturers direct
CYBERNETICS RESEARCH
120 LAWSON STREET
REDFERN 2016 Ph: 698-8286

Also available through
Micro Educational
17 Park Road
Garden Suburb 2288 NSW

or from most
computer shops

your ZX80 computer

TATTSLOTTO SIMULATOR ON THE ZX80

THE FOLLOWING program enables you to pretend that every night is Saturday night and to play Tattslotto.

Let us look at how one might design such a program from the beginning. The following method avoids the use of flow-charts which common experience indicates are usually only drawn after the program has been written and someone is screaming for documentation.

This approach is based on the TOP-DOWN approach which basically suggests that you should look at the problem from a very high perspective, then elaborate on each stage before even contemplating any actual programming.

After all, there is not much use in thinking:

LET G(I) = 0

if you finally decide that G(I) isn't even going to be used!

The other benefit is that the program is more easily broken down into modules, and you can write, test and debug the modules independently. This is the easy way of breaking down a long program into smaller more manageable units.

Let us look at what one might think of when designing a Tattslotto program. The very first TOP-DOWN analysis would probably yield something like:

- Ask for player's guesses
- Draw numbers and print them
- Draw supplementary number
- Check how many guesses correct
- Ask player if he wants to play again

Now I don't think that kind of programming design is beyond anybody. You can easily see all the different stages, and if that basic design doesn't have all the features you want, then now is the time to do something about it.

It may well be that you really want a program that will also draw a thousand weeks' worth of numbers and analyse your chances for a particular set of numbers. It would be silly to write the whole program to find it almost impossible to modify it to what you want.

The next stage is the expanded TOP-DOWN. In this case we show you the entire program structure to very minute detail, but in a more complex program it might make more sense to expand and develop one module at a time.

```

GUESS ASK FOR PLAYER'S GUESSES:
FOR GUESSES 1 TO 6
INPUT NUMBER
CHECK IF NO IS BETWEEN
1 AND 40. IF NOT, GO
TO INPUT NUMBER AGAIN
NEXT GUESS

```

```

DRAW FOR DRAW 1 TO 6
SELECT RANDOM NUMBER
HAS NO. ALREADY BEEN DRAWN?:
FOR ALL DRAWN NOS.
IS NEW NO.=DRAWN NO.
IF YES THEN GO TO SELECT
RANDOM NUMBER AGAIN
NEXT DRAWN NUMBER
IS THIS SUPPLEMENTARY NUMBER?:
IF YES THEN GO TO SUPPL
PRINT NUMBER DRAWN
WAIT FOR PLAYER RESPONSE
NEXT DRAW
SUPPL PRINT SUPPLEMENTARY NUMBER DRAWN
RESULT CHECK HOW MANY CORRECT GUESSES:
SET CORRECT GUESSES, CORRECT SUPPL
EQUAL TO ZERO
FOR ALL GUESSES
CHECK AGAINST ALL DRAWS:
FOR ALL DRAWN NOS.
IS GUESS=DRAW?:
IF YES, INCREASE
CORRECT GUESSES BY 1
NEXT DRAWN NO.
CHECK AGAINST SUPPLEMENTARY:
IF EQUAL, SET CORRECT
SUPPL = 1
NEXT GUESS
PRINT CORRECT (AND SUPPL IF APPLICABLE)
NUMBER OF GUESSES
AGAIN ASK PLAYER IF HE WANTS TO PLAY AGAIN:
IF NO, THEN STOP
ELSE ASK PLAYER IF HE WANTS SAME GUESSES:
IF YES, THEN GO TO DRAW AGAIN
ELSE START AT GUESS AGAIN

```

The other really nice thing about designing a program in this way is that you can read the program in English. If the language you are using isn't absolutely clear then the chances are that when you get down to writing it out in BASIC you will make a mistake.

This approach also lets you design a program today and come back in a month's time and it will still make sense, whereas a program full of G(I) and A\$ will not.

The other benefit is the very clear definition of FOR — NEXT loops and the immediate visual confirmation that your loops are correctly nested.

The next stage is to define your variables, so that you don't get things confused:

We chose G(6) for PLAYER'S GUESSES
S(6) for SELECTED DRAWS
R for NO. CORRECT GUESSES
X for SUPPL GUESS CORRECT
I,] for LOOP VARIABLE

Now all that is needed is to write the BASIC code (and you will no doubt be amazed at how similar the BASIC is to the English program), enter it in the Sinclair ZX80 and have a good time. □

TATTSLOTTO DRAW PREDICTOR

```

100 DIM G(6)
110 DIM S(6)
120 RANDOMISE
130 PRINT "ENTER NOS."
140 FOR I = 1 TO 6
150 INPUT G(I)
160 IF G(I) > 40 OR G(I)
< 1 THEN GO TO 150
170 PRINT G(I); " ";
180 NEXT I
190 PRINT
200 PRINT
210 PRINT "LOTTO"
DRAW ";Rnd(400)
220 PRINT "PRESS N/L"
230 FOR I = 1 TO 6
240 LET S(I) = Rnd(40)
250 FOR J = 0 TO I - 1
260 IF S(I) = S(J) THEN
GO TO 240
270 NEXT J
280 IF I = 6 THEN GO
TO 320
290 PRINT S(I); " ";
300 INPUT A$
310 NEXT I
320 PRINT ,, "SUPPL ";S(6)
330 PRINT
340 PRINT
350 LET R = 0
360 LET X = 0
370 FOR I = 1 TO 6
380 FOR J = 1 TO 5
390 IF G(I) = S(J) THEN
LET R = R + 1
400 NEXT J
410 IF G(I) = S(6) THEN
LET X = 1
420 NEXT I
430 PRINT R + X; " CORRECT ";
440 IF X > 0 THEN PRINT
"INCL SUPPL"
450 PRINT
460 PRINT
470 PRINT "AGAIN?"
480 INPUT A$
490 IF NOT CODE(A$) = 62
THEN LIST
500 PRINT "SAME NOS?"
510 INPUT A$
520 CLS
530 IF CODE(A$)=62 THEN
GO TO 200
540 RUN

```

Continued from page 55

SUCCESS WITH NADOW

GARY LEHURAY was 16 years old when he dived off Forster Bridge, hit a sandbank and became a quadraplegic. That was over six years ago and Gary is now employed as a computer programmer with the NSW Public Service Board.

His story is similar to that of hundreds of disabled men and women who are now employed as qualified members of the computer industry, thanks to their own hard work and the help of NADOW Australia, office and computer training for the disabled.

It was not until three years after his accident that Gary felt prepared to enter the workforce. Among other problems was the choice of what to do. A social worker at the Royal North Shore Hospital suggested the St Leonards-based NADOW and soon after Gary was enrolled in the association's 13-week office training course.

All graduates from NADOW undertake the office course. It gives them a grounding in office procedures and introduces them to a number of fields which they may wish to concentrate on further. Gary chose computers and undertook an IBM

computer aptitude test. He also sat for a six-and-a-half-hour test with Chandler and MacLeod and both showed he was well suited for the field.

After less than two months in NADOW'S computer training scheme Gary was chosen to take up a computer programming course donated by the Control Data Institute. Seven months later he passed the course in the top 10 per cent of students.

Then, for Gary, came the depressing time.

"I was fully trained but I was in the classic Catch 22 situation", he explained. "If I wanted a job I had to have work experience. To get work experience I had to have a job."

"Miss Blackmore, the founder of NADOW suggested I get work experience through one of the companies which supports the association, so for eight months I trained with Idaps Computer Science Ltd.

"They gave me an excellent reference and two weeks later I got my present job. The people are terrific and because it's the public service there's no problem with

the structure of the building such as steps and the like."

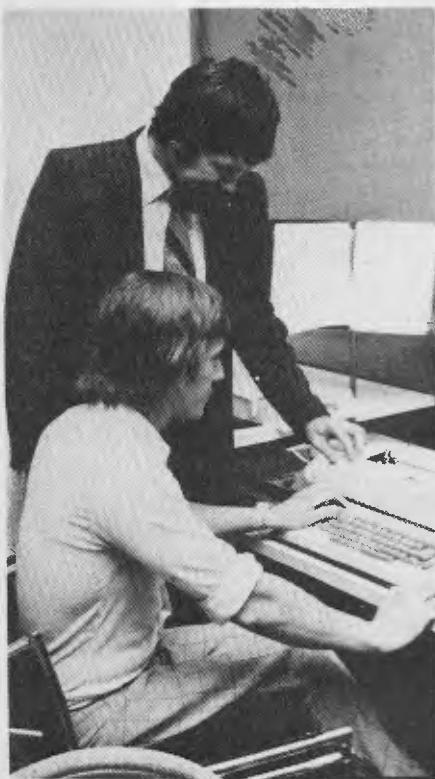
For another graduate of the computer training scheme, 22-year-old Ann Harris, the NADOW contact came from close to home. Ann, who has suffered from the disease cerebral palsy since birth heard of the course from her mother, a nurse who was part of an audience addressed by Miss Blackmore.

Ann only had a "vague interest" in computers at the time but now is a shift leader and operator for the insurance company Mercantile Mutual.

After completing the office training course and a month at NADOW, Ann joined Rank Xerox for her six months' job experience, made up of one month as an operator and five as a programmer.

She said she found a little hesitation on the part of her employers.

"When I went to interviews they were all pretty similar," she said. "There were the normal education hassles that everyone gets then the 'Are you sure you can do the job?' questions. Once I proved I could do the job properly everything was great". □



NADOW computer training scheme manager Peter Rallings instructs a paraplegic trainee in the operation of an IBM 2741 remote computer terminal.

NADOW

NADOW — the National Association for Training the Disabled in Office Work — was established in 1965 by Miss Sheila Blackmore in an attempt to alleviate some of the problems of the disabled in Australia. Its symbol is a large red broken pencil. Broken but still functional and ready to do the job.

In this symbol lies the whole theme of the work of NADOW.

The association is voluntary, funded by business people who recognise the need to provide an assessment and on-the-job training facility in which handicapped men and women can gain experience in office skills and procedures.

NADOW is not a sheltered workshop in that it does not employ the disabled. Rather, it trains them to compete in the open market against the able-bodied for employment in the business field.

Initially, through her work as advisor to the handicapped section of the Girl Guide Association, Miss Blackmore discovered that, when given the opportunity, handicapped children could develop into happy and useful citizens. She also found that senior handicapped Guides who wished to enter the office field could not gain employment, not because they lacked ability, but because they lacked experience and self-assurance.

Miss Blackmore decided to conduct a survey of existing facilities for office training programs for the handicapped. No practical one existed. This led her, together with some of her business colleagues and members of the Rotary Club of Sydney to found NADOW.

Until 1980 almost 600 disabled people had benefited from NADOW training programs.

One of the greatest contributions to the overall acceptance of NADOW has been the assistance given by associate companies. The scheme comprises a maximum of 20 major business houses, some multi-national, which join the group for a year by making a financial contribution and nominating one or more representatives to the NADOW computer training scheme committee. These representatives use their professional skills to assist and advise the NADOW staff in the administration of the training programme.

Option to renew membership as an associate is extended annually. □

your computer text file

Teaching A Teacher

YOUR COMPUTER has filled a growing need in my education. As a retired maths teacher, I had never taken computers seriously; I knew that they were there, of course, but had never understood their intricacies or their fascinating versatility. *Your Computer* has given me a tantalising glimpse of these attributes. Thank you.

Its message hit me like a clap of thunder — it was for me the biggest surprise since ma caught her mammillae in the mangle. I play correspondence chess and to be able to program all my games, play on beyond the present moves towards conclusion and then instantly revert to status quo is a prospect which I view with considerable relish.

My other interests include coastal and celestial navigation, both of which have great programming possibilities and my only problem at the moment is to decide whether to purchase the necessary hardware (have I caught the jargon?) now or to wait for the prize APF Imagination Machine, which I surely must win.

NEVILLE ROGERS,
Williamstown, Vic.

Instructions At A Price

REGARDING the computer competition, I will tell you why I would like the APF Imagination Machine. There are a number of logical errors in the designs of the computer's languages. Machine language by a microprocessor and the TTL logic circuits are reasonable, and go at high speed.

WE WELCOME readers' letters. Not only do we enjoy reading them (most of the time . . .), we want to publish them so other people can look in on your news and views.

Constructive criticism, lavish praise for our efforts, helpful hints for other micro users; if there is something you would like to say, write to Your Computer at PO Box 216, Spit Junction, NSW 2088.

BASIC goes at a slow speed, for some strange reason.

If you would like a language that goes at high speed, needs less memory space, and is easy for the person to use (typing instructions is not easy for the average person, there are simpler ways), then send \$12,500 and I will send the mathematics and procedures needed.

If you want the instructions for an EPROM, send the machine level instructions and I will write the instructions — for a total of \$25,000.

There are no errors in the logic chips you can buy, the errors are in the design of the high level language.

ALLAN SHARROCK
Wendouree, Vic

More Fan Mail

CONGRATULATIONS on your first issue. *Your Computer* has provided me with en-

ough information in one issue to decide on the micro most suited to my needs.

Features like the Glossary and articles on the basics of microprocessors are a welcome change from the 'heavier' articles found in other magazines.

Generally speaking I would say the concept of *Your Computer* has been fully realised. Your team should be proud of the effort. Keep up the good work!

STEVE QUINN
Spreyton, TAS

Shock! ZX81 Hits Britain

WITH REFERENCE to your May/June issue and the story ZX80 and counting, The rumours about the ZX81 are not another example of Clive Sinclair's bent for generating a bit of pre-release publicity. They are in fact true. The ZX81 has been on the market for four months in the United Kingdom for a kit price of less than \$100! One wonders what Sinclair Equipment Australia is up to?

P.D. JACKSON
Hurstbridge, Vic

Yes; one wonders... (Ed)

ZX80 Fan Club

PLEASE print plenty of *Your Computer* copies for Sinclair ZX80 users!

Looking forward to your magazine's next issues.

E.J. DUFFIELD
Kalgoorlie, WA

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Insurance Broking

BEFORE I buy a microcomputer I am trying to locate a supplier of a software program for insurance brokers. Once I have located a suitable program I can match the hardware.

Hope you can help out.

—MG, Mudgee, NSW

We asked David Begg of SI Microcomputers, who is well acquainted with the needs of insurance brokers, what software he knew of. He recommends Six-S Software's Insurance Brokers Management and Information System, a complete package which should meet your needs. The software produces a number of special reports and analyses, and even prints Certificates of Insurance. For further information, contact SI Microcomputers at GPO Box 72, Sydney 2001, or Phone (02) 231 4091

Family Historians

I WAS interested in the reference in Your Computer (May/June) to the application of a microcomputer to analysing historical information.

—FWS, Moggill, Qld

...and Another

PLEASE consider me a complete novice regarding computers. It was only reading through your May/June issue that I realised a computer could assist with my after-work occupation.

I am the historian for my family whose members reach back to the first fleet and beyond and number many hundreds. I have them all catalogued and would like to enter all the details on a computer.

Do you think a Dick Smith System 80 or an Apple could handle 500 entries, to be recalled at will? I'd like to work on a budget of \$1000, but have plenty of time to learn BASIC.

—WAJ, Telegraph Point, NSW

The major application of microcomputers in historical research is to store a database of information which can be sorted and indexed as required.

(For an example of how to do this, see the October 1979

issue of Byte magazine, which included a short article on the subject of genealogy. The example program given in the article can be used to store information such as birth date and place, parentage, marriages and date and place of death, along with supplementary information obtained from documents such as marriage certificates.)

The use of such a program implies that instant access to the data is required, and this can not be achieved using cassette storage — floppy disks will be required. Assuming that you save 500 characters of information for each member of your family tree, then each mini-floppy disk will allow you to store data on perhaps 150 people, allowing space on the disk for some programs. So for best results, a microcomputer with one or two minifloppies would be required, and a printer would also be handy — which puts the cost up to \$2000 - \$3000.

Source Hookup

WHAT KIND of computer terminal do I need to access the Source?

—FW, Brisbane

To access the Source, you will need a terminal or computer with a serial interface (either RS-232C or 20 mA current loop) which can attach to an acoustic coupler. That's the hardware. The terminal can be as simple as a 'dumb terminal', but it's better to use a computer with a special program.

You can write a simple program to send characters to the serial port from the keyboard and to display received characters, or you can use a more sophisticated program which is capable of transmitting and receiving files. This will also give you the ability to exchange files with your friends.

For example, on our systems we have several different programs. On the Apple, we use the communications mode of the Vision-80 video card along with an Apple communications card, although there is an excellent program called ASCII Express which provides even more facilities. On the S-100 system, we use an excellent program called Telnet, which is part of the BD Software C Compiler package. □

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your APPLE computer

Hi! SINCE being asked to write an article on the Apple for this month's issue, I have been busily wandering through all the available local and overseas magazines, just to see what the rest of the Apple world was up to.

I think the one common denominator was the authors seem to be addressing the longer-term Apple users, those who have learned all of the basics of microcomputers and are interested in stretching the capabilities of their individual machines.

When I first bought my Apple, about three-and-a-half years ago, the documentation that came with it was hopelessly inadequate. Unlike today, most micro users relied on the magazines as a venue from which to glean some knowledge about their machines.

The microcomputer magazines were themselves just starting overseas, and authors and readers alike were breaking new ground together. There were plenty of articles about BASIC programming and different locations in the Apple that could be PEEKed and POKEd, and the strange and wonderful changes they made to their mysterious box.

Today these would be seen as "kids stuff", and laughed out of the editor's office.

Bearing all this in mind I have decided to go back and cover some of the things I found useful in the early days with my Apple, for those who have recently bought their own Apple and do not have access to the early articles.

One frequent complaint about the Apple II is that it cannot print lower case characters easily from the keyboard.

This problem can be overcome quite easily by one poke command at location 243.

Before a character is printed by the Apple either on video screen or printer, it adds the contents of decimal location 243 to the character value in the accumulator. If we have a look at location 243 with a PRINT PEEK (243) command the value returned will be a zero. So it seems every time a character is output by the Apple, the machine adds zero to it and then continues to print it.

If we look at an ASCII chart, we will see that the capital letter 'A' has a decimal value of 65 and a small 'a' has a value of 97. The difference between these two numbers is 32.

How do we make this work for us? By adding 32 to the ASCII value of any uppercase letter (as produced by the Apple keyboard), a lower case character will be printed.

Here is a quick example of what I mean.

The program below will quickly allow any printer attached to slot one to be used as a typewriter. The shift function is controlled by pressing the ESC key. To end the print routine, type control-C.

```
30 GET CH$:REM THIS LINE WILL GET 1
CHARACTER FROM THE KEYBOARD
40 SH = PEEK(243):REM THIS LINE TESTS
THE CURRENT STATUS OF THE SHIFT KEY
50 IF CH$=CHR$(27) AND SH =32 THEN
POKE 243,0:REM CHR$(27) = ESCAPE
THIS LINETEST FOR A CHANGE TO
UPPERCASE
60 IF CH$=CHR$(27) AND SH = 0 THEN
POKE 243,32:REM THIS LINE TESTS FOR
A CHANGE TO LOWER CASE
70 IF CH$=CHR$(3)THEN PR#0:END:REM
THIS LINE TESTS FOR END OF PROGRAM
CONTROL-C
80 PRINT CH$;:GOTO30:REM PRINTS THE
CHARACTER THEN LOOPS BACK TO GET
NEXT CHARACTER
```

This is still primitive, but it does explain how POKE 243,32 can be used. This will only work with a printer or a video device (such as an 80-column card) that has a lower case capacity. The video output from the Apple has no lower case characters defined (as shown in the Apple II Reference Manual page 15), so if you try to print the lower case letter 'a' with the following insert, the printer would produce a lower case 'a' and the video output from the Apple would produce the character! on the screen.

```
PR#1:POKE243,32:PRINT"A":PR#0
```

This can produce some interesting effects. Try loading any program into your Apple. Then poke 243,32 and list the program. It all appears as garbage. Now run your cursor up and over the last line printed. Immediately the characters have been changed back to normal... Why? I'll leave that for you to play with.

I have included the first half of the ASCII code with this column. The second half is identical to the first except, the numerical value for each character is (dec) 128 higher.

The reason I have included them all will become obvious to all who have tried to interface their Apple to an external peripheral. Nearly all the printers and interface cards available for the Apple today require control commands from you to tell it what or how to do some task. The most famous example is Apple's own parallel interface card that requires the command PRINT "(control)I127N" to adjust the

page width so that the interface card will not insert a carriage return after 40 characters have been printed.

The first 31 character positions in the ASCII code have been set aside for control commands. These are codes used to convey instructions from one device to another. For example, if I have a printer attached and I enter (control)J, a command will be sent to the printer to do one line feed. The same instruction could be done with the command PRINT Chr\$(10). If we look at the ASCII table, we see that Chr\$(10) is the same as typing (control)J.

If, within a program, as a response to an input statement you wish to test for carriage return, all you have to do is look at the table and find the ASCII value — for example:

```
10 INPUT A$
20 IF A$=CHR$(13)THEN PRINT"YOU TYPED
A CARRIAGE RETURN":GOTO40
30 PRINT A$
40 GOTO10
```

If you wish to print any of the special characters that are not normally available from the Apple's keyboard, just include the Chr\$ command with the decimal value that matches the character you wished to print:

```
10 PRINT "APPLE ":CHR$(93):CHR$(91)
```

The best way to become familiar with the ASCII code and key combinations which produce the different commands is to play around with them and use them.

In the table I have given the decimal and hexadecimal values for all the ASCII commands and characters as well as the name of the character and which key(s) to press to obtain that character from the Apple keyboard. I have inserted a small c or small s to indicate the control (CTRL) or shift keys are held down, while the letter not in parentheses is typed; for example, K(cs) means (control/shift)K.

Just to finish off, I thought I may add something for some of the more adventurous readers to think about.

If the following statement is added to a BASIC program and that program is then LISTed, then your Apple will stop listing the program and execute the DOS command immediately following the (control) D in position 31.

```
11REM67890123456789012344567890PR#6
```

This particular example will wipe the current program and reboot DOS. It is just a quick, though not very sophisticated, way of stopping snooping at your BASIC program.

—Greg Stringer

ASCII CODE TABLE - APPLE

DEC	HEX	PRINT	CHR\$	SYMBOL	KEYS	MEANS	DEC	HEX	PRINT	CHR\$	SYMBOL	KEYS	MEANS
000	\$00	CHR\$(0)	NUL	P (cs)	NULL		064	\$40	CHR\$(64)	Ø	Ø		Commercial At
001	\$01	CHR\$(1)	SOH	A (c)	Start Of Heading		065	\$41	CHR\$(65)	A	A		
002	\$02	CHR\$(2)	STX	B (c)	Start Of Text		066	\$42	CHR\$(66)	B	B		
003	\$03	CHR\$(3)	ETX	C (c)	End Of Text		067	\$43	CHR\$(67)	C	C		
004	\$04	CHR\$(4)	ETB	D (c)	End Of Transmission		068	\$44	CHR\$(68)	D	D		
005	\$05	CHR\$(5)	ENQ	E (c)	Enquiry		069	\$45	CHR\$(69)	E	E		
006	\$06	CHR\$(6)	ACK	F (c)	Acknowledge		070	\$46	CHR\$(70)	F	F		
007	\$07	CHR\$(7)	BEL	G (c)	BELL		071	\$47	CHR\$(71)	G	G		
008	\$08	CHR\$(8)	BS	H (c)	Back Space		072	\$48	CHR\$(72)	H	H		
009	\$09	CHR\$(9)	HT	I (c)	Horizontal Tab		073	\$49	CHR\$(73)	I	I		
010	\$0A	CHR\$(10)	LF	J (c)	Line Feed		074	\$4A	CHR\$(74)	J	J		
011	\$0B	CHR\$(11)	VT	K (c)	Vertical Tab		075	\$4B	CHR\$(75)	K	K		
012	\$0C	CHR\$(12)	FF	L (c)	Form Feed		076	\$4C	CHR\$(76)	L	L		
013	\$0D	CHR\$(13)	CR	M (c)	Carriage Return		077	\$4D	CHR\$(77)	M	M		
014	\$0E	CHR\$(14)	SD	N (c)	Shift Out		078	\$4E	CHR\$(78)	N	N		
015	\$0F	CHR\$(15)	SI	O (c)	Shift In		079	\$4F	CHR\$(79)	O	O		
016	\$10	CHR\$(16)	DLE	P (c)	Data Link Escape		080	\$50	CHR\$(80)	P	P		
017	\$11	CHR\$(17)	DC1	Q (c)	Device Control 3		081	\$51	CHR\$(81)	Q	Q		
018	\$12	CHR\$(18)	DC2	R (c)	Device Control 2		082	\$52	CHR\$(82)	R	R		
019	\$13	CHR\$(19)	DC3	S (c)	Device Control		083	\$53	CHR\$(83)	S	S		
020	\$14	CHR\$(20)	DC4	T (c)	Device Control 4		084	\$54	CHR\$(84)	T	T		
021	\$15	CHR\$(21)	NAK	U (c)	Negative Acknowledge		085	\$55	CHR\$(85)	U	U		
022	\$16	CHR\$(22)	SYN	V (c)	Synchronous Idle		086	\$56	CHR\$(86)	V	V		
023	\$17	CHR\$(23)	ETB	W (c)	End Of Transmission Block		087	\$57	CHR\$(87)	W	W		
024	\$18	CHR\$(24)	CAN	X (c)	Cancel		088	\$58	CHR\$(88)	X	X		
025	\$19	CHR\$(25)	EM	Y (c)	End Of Medium		089	\$59	CHR\$(89)	Y	Y		
026	\$1A	CHR\$(26)	SUB	Z (c)	Substitute		090	\$5A	CHR\$(90)	Z	Z		
027	\$1B	CHR\$(27)	ESC	K (cs)	ESCAPE		091	\$6B	CHR\$(91)	{	{		Open Bracket
028	\$1C	CHR\$(28)	FS	L (cs)	File Separator		092	\$5C	CHR\$(92)	\	\		Reverse Slant
029	\$1D	CHR\$(29)	GS	M (cs)	Group Separator		093	\$5D	CHR\$(93)	]	]		Closing Bracket
030	\$1E	CHR\$(30)	RS	N (cs)	Record Separator		094	\$5E	CHR\$(94)	^	^		Circumflex/Up Arrow
031	\$1F	CHR\$(31)	US	O (cs)	Unit Separator		095	\$5F	CHR\$(95)	_	_		Underline
032	\$20	CHR\$(32)	SP	SP	Space		096	\$60	CHR\$(96)	¸	¸		Cent Sign/Grave Accent
033	\$21	CHR\$(33)	!	!	Exclamation Point		097	\$61	CHR\$(97)	a	a		
034	\$22	CHR\$(34)	"	"	Quotation		098	\$62	CHR\$(98)	b	b		
035	\$23	CHR\$(35)	#	#	Hash/Number		099	\$63	CHR\$(99)	c	c		
036	\$24	CHR\$(36)	\$	\$	Dollar		100	\$64	CHR\$(100)	d	d		
037	\$25	CHR\$(37)	%	%	Percent		101	\$65	CHR\$(101)	e	e		
038	\$26	CHR\$(38)	&	&	Ampersand		102	\$66	CHR\$(102)	f	f		
039	\$27	CHR\$(39)	,	,	Apostrophe		103	\$67	CHR\$(103)	g	g		
040	\$28	CHR\$(40)	(	(	Opening Parenthesis		104	\$68	CHR\$(104)	h	h		
041	\$29	CHR\$(41)	)	)	Closing Parenthesis		105	\$69	CHR\$(105)	i	i		
042	\$2A	CHR\$(42)	*	*	Asterisk		106	\$6A	CHR\$(106)	j	j		
043	\$2B	CHR\$(43)	+	+	Plus		107	\$6B	CHR\$(107)	k	k		
044	\$2C	CHR\$(44)	,	,	Comma		108	\$6C	CHR\$(108)	l	l		
045	\$2D	CHR\$(45)	-	-	Hyphen/Minus		109	\$6D	CHR\$(109)	m	m		
046	\$2E	CHR\$(46)	.	.	Period		110	\$6E	CHR\$(110)	n	n		
047	\$2F	CHR\$(47)	/	/	Slant		111	\$6F	CHR\$(111)	o	o		
048	\$20	CHR\$(48)	0	0			112	\$70	CHR\$(112)	p	p		
049	\$31	CHR\$(49)	1	1			113	\$71	CHR\$(113)	q	q		
050	\$32	CHR\$(50)	2	2			114	\$72	CHR\$(114)	r	r		
051	\$33	CHR\$(51)	3	3			115	\$73	CHR\$(115)	s	s		
052	\$34	CHR\$(52)	4	4			116	\$74	CHR\$(116)	t	t		
053	\$35	CHR\$(53)	5	5			117	\$75	CHR\$(117)	u	u		
054	\$36	CHR\$(54)	6	6			118	\$76	CHR\$(118)	v	v		
055	\$37	CHR\$(55)	7	7			119	\$77	CHR\$(119)	w	w		
056	\$38	CHR\$(56)	8	8			120	\$78	CHR\$(120)	x	x		
057	\$39	CHR\$(57)	9	9			121	\$79	CHR\$(121)	y	y		
058	\$3A	CHR\$(58)	:	:	Colon		122	\$7A	CHR\$(122)	z	z		
059	\$3B	CHR\$(59)	:	:	Semicolon		123	\$7B	CHR\$(123)	{	{		Opening Brace
060	\$3C	CHR\$(60)	<	<	Less Than		124	\$7C	CHR\$(124)	\	\		Vertical Line
061	\$3D	CHR\$(61)	=	=	Equals		125	\$7D	CHR\$(125)	]	]		Closing Brace
062	\$3E	CHR\$(62)	>	>	Greater Than		126	\$7E	CHR\$(126)	^	^		Overline/Tilde
063	\$3F	CHR\$(63)	?	?	Question Mark		127	\$7F	CHR\$(127)	DEL			DELetete/rubout
							128	\$80	CHR\$(128)				

your SORCERER computer

THERE COMES a time when your wife/husband, girlfriend/boyfriend or worst of all your mother-in-law walks up to you whilst you are at the computer and says those fatal words; "It's very nice dear, but what can it do?"

This time I'd like to tell you about two ways to answer that question. Arrington Software's Music and Quality Software's Graphic Animation Package.

Arrington Software's Music sells for around \$54 and is made up of the program itself, a music file (more about that later) and a small PCB that plugs onto the Sorcerer's parallel port. When the program is loaded it displays a base and treble stave on the screen. It also displays a selection of the commands that are controlled by the alternate keypad.

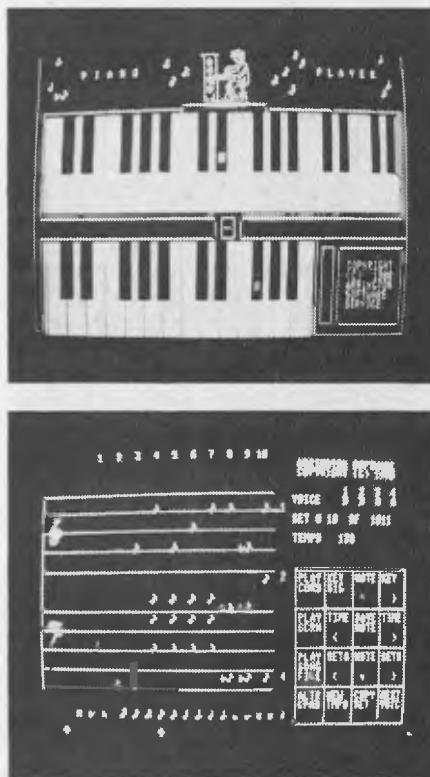
You have the ability to write music just as you would on paper using standard notation. You can enter up to four notes in a chord. You have complete editing facilities. You can add extra chords, delete any you don't want or modify a chord at any time. You can hear the current chord, the last ten, or the whole song file. You can even step through a tune one chord at a time listening to pick up any bad notes, and this is only the editor.

You also can alter the tempo or even transpose the tune up or down the scale. When you are happy with the tune you can save it on a cassette. You can also load pre-recorded music files.

If you have any secret desire to write music you must have this program. It is fantastic!

For another \$19.00 you can have another program called Piano Player that patches onto Music. This is a graphic display of a piano keyboard that shows which notes are being played and there is even a small man who sits and plays the piano, his arms move in time to the music being played. If you only want this program to impress mothers and other non-computer people you can buy song files for around \$5, but after you have played with the editor you will probably want to have a try at making your own tunes.

In addition to the editor you can call the music generation program from within your basic programs. This means you can write a small tune, save it on tape, load this tune into an area of memory you are not using and call it at any time. It is possible to change the tone of the notes to suit yourself, so aside from the crowd pleasing aspects it is a good way to add sound to your Sorcerer.



There is only one thing that bothered me in the program, that is the program stores each chord as five bytes, four for the notes and one for the timing of the chord. This means that all four notes in a chord must be of the same duration but the editor will let you enter notes of different duration onto the screen. Once you are aware of this it's easy to get around this very minor problem.

The other program I want to tell you about is a utility program from Quality Software called "The Graphics Animation" Package. It can be bought for around \$30. The system is added as the first two lines of your own program. This program will make it easy to do almost anything graphical with your Sorcerer. There is even a separate routine to help you create your graphic characters, and routines to do just about anything else.

You can clear the screen without resetting your graphics characters or plot at any given location on the screen any single character, and that is the easy stuff. You can set up an image using any number of graphics characters and move that image around the screen as a single block. When the block moves over a char-

acter already on the screen that character is removed and then replaced after the image has moved off the spot it was on.

This means you do not have to go through a complex routine to restore the background when you move an image around the screen, it is done automatically!

Aside from being able to move graphic blocks around it is only a single command to define a second block. This means you can have several slightly different images or "frames" by swapping these frames onto the same position on the screen you can very easily animate a character or image, and there is still more. You can do these operations using the standard Sorcerer graphics or in a low resolution mode that gives you a 128—90 pixel grid (slightly higher than the graphics of the TRS-80/System 80). In the low resolution mode you can turn on or off any pixel.

There is also a routine that will scan the keyboard for any input. This keyboard scanning routine returns the ASCII code of any key depressed or indicates when there are no keys in use.

This is probably the most useful utility package I have ever used. There isn't a single program that I have written that couldn't be improved using this package. Aside for its obvious uses with graphics I have been using it to make my non-games programs more interesting.

I have even used the animation to scroll messages across the screen without disturbing the background information. This makes error messages very visible. You can have a message scroll over the incorrect input and then ask for a fresh input that makes it very easy to see where you have gone wrong.

If you want your Sorcerer programs to be just that little bit better than anyone else's you must have this package.

On the subject of software I must ask you a question. A couple of weeks ago some diabolical person sold me a program called "Mission Impossible", one of a series of adventure programs. I have been using it for at least 10 hours and it is driving me crazy. Can anyone tell me how to catch the man who runs away whenever I enter a room? Even a hint will help. See you next month. □

—Paul Beaver

your PET computer

I'M HAPPY to report Commodore has reduced some of its prices, if only marginally. I would like to claim my column in *Your Computer* last month was a contributing factor, but Commodore did announce the new prices to dealers before the issue was released.

The prices piece was, however, written about three weeks before the news came through; and being a fair-minded chap, I did tell Commodore some time beforehand that I was going to give a go at the pricing policy.

I still feel the prices are too high, even with these reductions. . .

The 4016

Never failing to amaze, Commodore has now announced the availability of the 4016 with a larger screen. In fact it's the same screen used in the 8000 series, but sticking to the standard forty-column format. Without downgrading the importance of product improvement, I still must say I would be far from happy if I had just bought a small-screen 4016.

In fact this method of upgrading has always been a major source of annoyance with Commodore.

As an example, look at what has happened to the basic PET. If I had bought one of the first PETs in February last year I would have paid about \$1499 for an 8K old-ROM version. A few months later it was \$1199; then two months later it dropped to \$999, with \$150 worth of programs thrown in.

By November you could get an 8K, large-keyboard new-ROM 3008 for \$999. Come January there was the 4008 then two months later the 4016. Now there is the 4016 with larger screen. It gives you a great sense of security for your investment, doesn't it. . .

I wonder what price the 8032 or 4032 will be next year? (note the 4016 price does not include the cassette — it's down from \$126 to \$114).

Cursor Magazine

One of the greatest joys available to a PET user is Cursor Magazine (which, I had best point out before the editor deletes this paragraph through fear of competition, is a cassette-based bi-monthly magazine).

Cursor comes with six programs per tape and a single sheet of descriptions and general information about Commodore.

The programs vary from mediocre to exceptional, but I have never found a bad one. The editorial is fearless in its approach to Commodore, with praise and

criticisms of the product and marketing strategy (I'm not alone).

Up to now the only way you could get your hands on Cursor was to trust your money to the Post Office and Qantas through the overseas mail service for quite some time before those magical programs would come thudding on your doorstep to brighten your evening with new discoveries for the PET.

An enterprising young gentleman has, however, decided to arrange for the distribution of Cursor here in Australia. John Guidice of The Microcomputer House will supply you with copies if you send him the money.

Disk Drives

Commodore is now saying it is likely that September will bring forth to our shores that mystical machine, the single disk drive! As yet there is no price but the rumours are that it will be around \$800, and that it will have a capacity of 170K.

I know this will come as a shock to those old owners who have heard the same rumours for the past two years. It will not be before time as it has always been one of the biggest drawbacks for the home/hobbyist owner.

Incidentally, on the latest 16K models there is provision behind the name plate for the installation of disk drive units. If you don't believe me, open your CBM up and look inside where you will see two independent templates. These, I am informed, were where Commodore was originally going to build in the drives but for some reason did not.

For those who have always wondered why it has taken so long for the single drives to appear I was told that this was due to Commodore's decision to go to the IEEE 4888 bus which meant that it was more expensive to produce the controllers for the drives and that it was almost as expensive to produce one as it was two.

Commodore Products

In case you have the wrong impression, I think Commodore has a good product but, then, it is not perfect nor is any other manufacturer. It is only by bringing these problems up (which no doubt most CBM/PET owners have at times felt themselves) that makes it possible for Commodore to do something about them.

I believe after talking to many owners of other microcomputers and being in the position of selling many brands of computers that the Commodore would be one of the (if not *the*) most reliable of current microcomputers. □

—Peter Sandys

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Double Density CP/M Systems

FIRST SOME history. When Gary Kildall first implemented CP/M he used a Shugart eight-inch drive running in single density and wrote drive parameters of 26 sectors/track on 77 tracks into that CP/M, based on the IBM 3740 disk format. The very early versions of CP/M did not have a separate BIOS, everything was in the BDOS.

Later as the need to transport CP/M to a variety of hardware configurations became evident, most of the hardware dependent parts were moved into the new BIOS module. However, in all version 1 systems there are certain disk parameter tables which are still located in the BDOS.

Nearly all early implementations of CP/M used eight-inch disk systems; but Tony Gold of Lifeboat Associates saw a market for CP/M with North Star users and developed a CP/M for single density North Star disk systems. This was soon followed by a large number of implementations of CP/M for computers with 5½ inch-disk systems.

Double density disk systems for microcomputers became available at this time. It was virtually impossible for the user of a double density disk system to configure CP/M to run on their hardware due to the disk parameter information being buried in the BDOS.

Digital Research continued development of CP/M and released CP/M 2 which brought all the disk parameter tables out into the BIOS and added other system functions to allow user configuration in the field, not only for double density disk systems but also for hard disks. A flexible double density implementation is still not a trivial task by any means but now at least the end user has the necessary information to attempt it. Most double density system users still buy a preconfigured CP/M with their disk sub-system.

Unfortunately there is little format standardisation among eight-inch double density disk systems and it is often impossible to read double density disks done on a system with "foreign" disk hardware. However, as far as I am aware all double density eight-inch disk systems will also handle a "standard" single density CP/M disk. As a result eight-inch single density CP/M has remained the program distribution medium for most CP/M software.

The only real standard that exists for double density floppy disks is the IBM system 34 format. This requires track 0 to be still single density 26 sectors of 128 bytes/sector, while the rest of the disk is recorded in one of three double density formats — 26 sectors of 256 bytes/sector,

15 sectors of 512 bytes/sector or eight sectors of 1024 bytes/sector.

Many manufacturers cut corners by not sticking to the format requirement of single density on track 0 but recording this track in the same density as the rest of the disk (it makes the hardware design slightly easier). Also many opted for formats giving 50 to 52 sectors of 128 bytes/sector one each track as this avoided de-blocking in the BIOS. A few manufacturers, notably Morrow and Godbout, used the full IBM standard.

Even if there is format standardisation between systems it is still possible to configure the disk parameters in CP/M so that it is not possible to read CP/M files off the disk.

It is easy to see why single density is the distribution medium! With my Morrow discus 2D disk system I have been able to read double density disks from Godbout, IMS Intersystems and Tandy Model II CP/M systems — but dynamic modifications to the BIOS disk parameter blocks and/or sector translation tables have been mandatory in all cases except for Godbout.

With CP/M 2 there is no need to know anything about the density of the disk media. The drive capacity and certain other data about the physical layout of a drive are coded into tables in the BIOS. The data in these tables may indicate to the user what type of drive is connected to the CP/M system, but as far as the internal functions of CP/M are concerned the data is used only for managing access to the disk.

This makes CP/M independent of the physical characteristics of the drives connected to it as long as a correctly coded set of tables are present in the BIOS. This device independence is what makes it possible to have floppy and hard disks in the one system. It also means that the user needs some hardware-dependent utilities to be supplied with the CP/M system to make it function correctly.

SYSGEN and MOVCPM are utilities which should be supplied with all standard CP/M systems but will not be transportable to other systems. Other utilities such as DENSITY, DISKDUMP, REGEN etc. may also be supplied and these are generally written for the specific disk hardware supporting the CP/M system and are not transportable.

Any double density CP/M BIOS is certain to take up more memory space than the standard single density system used as an example in the CP/M manuals. If the manufacturer of the system has documented it properly you should be told explicitly what the system size is com-

pared to a "standard" system. This larger BIOS means less space for the TPA (Transient Program Area) and also means more space is needed on the system tracks of the disk.

Some double density BIOS are so big that they can't fit comfortably on the two tracks normally reserved for the system on eight inch disks (CP/M 2 allows the implementor to specify the number of system tracks whereas CP/M expected 2 system tracks). Intersystems overcomes this problem by having only a small minimal BIOS on a single system track which gets loaded at boot time and then looks for a file on the disk which contains the full BIOS and loads it.

With double density systems there are many, many possible ways of implementing the BIOS — how well they work is dependent on the skill of the programmer.

Some CP/M programs are written to bypass the BDOS system interface and go directly to the BIOS for disk system access, often these programs will only work on single density systems. They simply will not work, or even worse erase files, on double density systems. CP/M users group disks have quite a few programs like this, while certain commercial software is also set up for BIOS access. Be very careful about this and never test a new program on a disk that has files which are not fully backed up on another disk.

CP/M 3

Gary Kildall is reported as saying "CP/M 3 fills a gap in operating systems for high-end micros, where you're working with a Winchester disk and very little with floppies and where you expect some mini-computer features in a smaller system." Other Digital Research sources said that "for single user systems three may actually be a step backward. We'd hate to see people put off purchasing a system now — they may find CP/M 3 will solve problems they don't have".

So there you have it, CP/M will suit the high-end micro users — the small business users with hard disks and perhaps the really dedicated hobbyists. CP/M 3 will also be the best version to use in CP/NET networking. One feature will be a "test and write record" semaphore which will allow the safe sharing of common data files.

M-Disk

ANOTHER development from Digital Research is a new logical device called the M-disk which uses multiple banks of memory as a logical disk-like device. Its primary application would seem to be in

your computer glossary

Absolute: Located at a fixed address in memory.

Access: To read or write from a location in memory, or a file, or disk.

Accumulator: The major register of a CPU, in which arithmetic and logical functions are performed. Some computers have several registers which can function as accumulators; in others some registers can perform a subset of the full set of operations.

Address: A memory location which can contain data or an instruction.

Algol: Algorithmic Language, an early computer programming language for mathematical applications. Widely used in Europe, embodied early structured programming concepts and was a precursor of Pascal.

Algorithm: A set of instructions which define a method of obtaining some result (usually mathematical). A cooking recipe is an algorithm, as is a knitting pattern.

Alphanumeric: Composed of either letters or numbers or both.

Analogue (Analog): Representation of a value by a voltage or some other measurable datum, rather than a binary or other representation based on counting.

Apple: The Apple 11 computer is a computer based on the 6502 microprocessor with an integrated keyboard. Noted for its colour graphics capabilities, which make it popular with schools.

Application: What you do with your computer.

Array: A set of values under a common variable name, which are accessed through a subscript. For example A[1] is the first item in array A, A[2] is the second, etc. A[N] is the Nth item.

ASM: Assembler, also a suffix added to assembly language file names to distinguish them from other files with the same name.

Assembler: A program which converts assembly language into its corresponding machine (or object) code, which can be executed by the computer.

Assembly Language: A language in which each machine code instruction is represented by a short mnemonic which is much more comprehensible to the programmer. For example, the 8080 machine code

[10010110]
in binary, is
[SUB L]

(subtract L from accumulator) in assembly language. Each line of assembly language becomes one machine instruction.

Assign: To make one thing equal to another, e.g. [A = B] assigns the value of B to A.

Atom: An indivisible component of a data structure.

Attribute: A property possessed by some object, such as a file. Often attributes take the form of restrictions, such as a file being read-only.

Backup: An extra copy of a disk, tape or file taken as a precaution against damage of the original.

Backus Normal form: A special language (a metalanguage) used to describe precisely the grammatical rules of another language.

Base: The lowest number inexpressible in a given number system.

BASIC: Beginners All-purpose Symbolic Instruction Code. Invented in 1970 at Dartmouth College By Kemeny and Kurtz as a teaching language, it has since been enhanced in its more exotic forms into one of the most sophisticated yet easy-to-use languages available on personal computers. Its major rival is Pascal, which has the added virtue of stressing structured program design.

BDOS: Basic Disk Operating System. The major functional component of the CP/M DOS.

Binary: The system of counting in 1s and 0s used by all digital computers.

Binary Search: A method of searching for an entry in a table by successively halving the table until all that's left is the desired entry.

Binary Tree: A form of data structure in which entries are tagged on at the end of the appropriate branches.

BIOS: Basic Input/Output System. The part of the CP/M operating system which is different for each machine and provides any special I/O routines for disks, terminal, printer, etc.

Bit: Binary Digit. Either 1 or 0.

Boot: To load the operating system into the computer from a disk or tape, either initially or subsequently after running a program.

Bootstrap: To use one short program to load a longer loader program which then loads the operating system.

Branch Instruction: A program instruction which causes the computer to jump to another instruction, usually fairly close by.

Buffer: An area of memory used for temporary storage while transferring data to or from a peripheral such as a printer or a disk drive.

Bug: an error in a program. Makes programmers itch.

Bus: A set of wires over which, data, addresses, or control signals are transferred between the central processor and memory or I/O devices.

Byte: A computer word eight bits wide. A byte in memory can hold a character or a binary number between zero and 255 (or — 128 and 127), or a computer instruction.

C: A programming language, developed at Bell Labs, which is particularly convenient for writing system utility programs.

Case Statement: An instruction found in some high level languages which allows control to pass to one of several subroutines depending on the value of a variable. For example, the BASIC statement

ON X GOSUB 100, 200, 300

will jump to line 100 if X = 1, 200 if X = 2, 300 if X = 3.

Call: A jump to a subroutine which leaves the return address on the microprocessor stack, so that when the subroutine is finished executing, control returns to where it left off.

CBASIC: A commercial version of the BASIC language, running under the CP/M operating system. Doesn't use line numbers on every line, and is compiled, rather than interpreted like Microsoft BASIC.

CCP: Console Command Processor. The part of the CP/M operating system that reads a command line and sorts out what it means.

Chain: To automatically run one program after another.

Character: A letter or number, or in some circumstances, a control code such as "carriage return".

Checksum: A running total of the characters in a file, recorded or transmitted with the file so that errors can be detected.

Code:

Absolute: Machine instructions which are intended to be loaded and executed in a particular area of memory.

Object: Machine instructions, as distinct from the source code from which it was generated.

Reentrant: Code which can be used by several users at once, keeping separate variables for each.

Relocatable: Code which can be loaded and run anywhere in the computer's memory.

Source code: A program written in assembler, or a high level language such as BASIC, which must then be assembled or compiled to produce the object code which can actually be executed.

Cold Boot: To start up a system from scratch, loading the operating system from disk or tape.

Cold Start: See Cold Boot.

COM file: In CP/M parlance a command file, that is, a machine code program that can actually be run.

Command: An instruction from the console for the system to do something.

Comment: A note added into a program to help the reader (or programmer) to understand its operation. Does not affect the program's execution in any way.

Compiler: A program which accepts as input a source file written in a high level language, and produces as output an object file containing the machine instructions which are actually executed.

Computer: Are you serious?

Concatenate: To join two strings together, one after the other.

Conditional: A test; for example, is X greater than Y: IF X is greater than Y
THEN GOSUB 500 (BASIC)

or, if the carry flag is set, jump to location NEXDIG:

 JC NEXDIG (Assembler)

Conditionals are one of the most powerful features of any computer language.

Console: The keyboard and screen from which the operator controls the computer.

Control characters: Codes which perform functions like acknowledging correct receipt of a message or requesting retransmission of an erroneous message. Control characters are defined as part of the ASCII and similar codes.

Copy: To duplicate, usually for backup safety.

CP/M: A disk operating system for 8080 and Z80 based microcomputers. Allows the user to store information and programs in named files, as well as managing disk storage and input/output functions. Other disk operating systems include TRSDOS (on TRS-80) and DOS 3.3 (for Apple).

CRT: Cathode Ray Tube. Usually refers to the screen of a video terminal or the terminal itself.

Data: Information to be processed by, or output from, a program.

DDT: Dynamic Debug Tool. A program that

assists the user to find errors in machine code programs.

Debug: To locate and fix errors.

Decimal: Based on ten.

Delete: To erase.

Device: A piece of equipment such as a printer or tape drive which the computer uses.

Directory: A list of the programs on a disk (or occasionally tape) together with necessary information, such as length and location.

Disc: A flat, circular magnetic surface on which the computer can store and retrieve data and programs. Is fast compared with tape, particularly when access is not one item after another.

Disk drive: The mechanical assembly which rotates the disk and positions the read/write head.

Disk Operating System: A program which operates one or more disk drives automatically and manages the system.

Display: The computer's output device at the console, usually a TV-like display of letters and numbers; sometimes the computer can draw on the display.

Double Density: A method of recording twice as much information on a floppy disk.

Dump: To list out the contents of memory or a disk.

Echo: When the computer inputs a character from the keyboard, it then sends it back to the display so that you can see it was received correctly.

ED: An editor program; part of CP/M.

Editor: A program which lets you alter and correct source files and other documents.

Erase: See delete.

Error Message: Tells you something went wrong, and sometimes what.

Execute: To run a program; to follow its instructions.

FIFO: First in, first out.

File: A continuous collection of characters (or bytes) saved on a disk or tape for later reloading.

Fixed Point: Counting in integers only. Usually limited to small values, and restricted in accuracy, giving rise to ridiculous answers such as $9/5 = 1$.

Flag: A variable, sometimes a single bit, which can have only two values, used to indicate some condition.

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glossary

Floppy disk: A disk, made of thin flexible mylar, and enclosed in a card jacket, which can be used for magnetic storage. There are two varieties; eight inch and 5½ inch. These can typically store somewhere between 140,000 and 3 million bytes (characters).

Function: A sub-program that processes variables in some well-defined way.

Garbage Collection: The process of going through memory or disk space, reclaiming all the unused space.

Global: A variable which is known to all the parts of a program. See local.

Grammar: The formal rules of a language.

Hard Disk: A disk made of hard material, larger, faster and more fragile than a floppy disk, and capable of storing 70 million bytes or more.

Hard Copy: Printout.

Hardware: The bits of a computer you can kick, as opposed to the programs you can only swear at.

Identifier: A label, or the name of a variable.
Iff: If and only if.

Index: A variable which usually points to an entry in a table or list.

Index Register: A processor register which is used to access tables and lists in memory.

Indirect Addressing: Referring to a variable which actually contains the address of another variable.

Input: To get data into the computer.

Instruction: A step the computer can perform.

Integer: A whole number.

Intermediate Code: A special kind of object code which cannot be run directly on the computer, but must be interpreted.

Interpreter: A program which examines source code a line at a time, decides what it means, and then does it. Compare with compiler.

Interrupt: To electronically drag the computer away from what it is doing in order to respond to some time-critical situation.

I/O: Input/Output.

Jump Instruction: Normally, control proceeds from one instruction to the next, one after the other. A jump instruction passes control, not to the following instruction, but to some other. Jumps can be conditional.

Kilo: Prefix meaning one thousand.

Kilobyte: 1024 bytes (Kbyte).

Kilobaud: 1000 baud (Kbaud).

Label: A word which identifies the destination of a call or jump instruction, or simply identifies some location in memory.

Language: The set of instructions, and rules for stringing them together, which you use to instruct the computer what to do.

Library: A set of programs, or sub-programs.

Line Number: A number at the beginning of a line, which identifies it in a similar way to a label.

Line Printer: A high-speed printer for computer output.

Link: Part of a data item in a list, which tells the computer the location of the next data item.

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MBG JL/0181

- Macroassembler:** An assembler which can utilise macros.
- MBASIC:** Microsoft BASIC; the BASIC used in the TRS-80, PET, Apple 11 and so on.
- Memory:** Where the computer stores data and programs internally for fast access.
- Menu:** A display which offers the operator a choice of several alternatives.
- Microcomputer:** A small computer based on a microprocessor.
- Microprocessor:** The central processing unit of a computer, built into a single silicon chip.
- Mini-diskette:** A 5½ inch floppy disk.
- MP/M:** A multi-user version of CP/M.
- NAD:** A name and address file maintenance program.
- Numerical analysis:** The art and science of number crunching.
- Output:** What the systems produces.
- Packed Data:** Data which shares the same address, and has to be unpacked before use.
- Page:** A length of memory, typically 256 bytes.
- Parameter:** A constant which sometimes has to be varied.
- Parity:** An extra bit on the end of a character or byte for error detection.
- Pascal:** A modern structured language which may eventually rival BASIC in popularity.
- Password:** A secret word the system may demand of you before allowing you access to certain (or all) programs or data.
- Patch:** A temporary (ha,ha) fix on a bug.
- Peripheral:** A piece of equipment the computer uses, like a printer, disk drive, or modem.
- Peripheral Driver:** A program which outputs data to a peripheral and controls it.
- Physical Device:** See Logical Device.
- PIP:** Peripheral Interchange Program. A CP/M utility for copying files between devices.
- PL.1:** Programming Language 1. A good general purpose commercial language.
- Pointer:** A variable used for indirect addressing.
- Program:** A sequence of instructions which can be understood, and ultimately followed, by a computer.
- Prompt:** A message asking the operator to supply information.
- Queue:** A list in which entries are made at one end, and removed from the other.
- R/O:** Read Only; cannot be overwritten.
- RAM:** Random Access Memory.
- Random Access Memory:** The computer's internal memory which is used to hold running programs and data. The computer can both write and read RAM.
- Relocatable Object Module:** Part of a larger program consisting of many such modules, all linked together and located.
- Resident:** Permanently in the system.
- Reverse Polish Notation:** See Postfix.
- RPN:** See Reverse Polish Notation.
- Run:** To execute a program.
- Save:** To store a program on disk or cassette (particularly BASIC).
- Schedule:** To decide at what stage a process should run (of an operating system).
- Screen:** See CRT.
- Sector:** A section of data on a disk.
- Simulation:** Making one system behave like another.
- Software:** Programs.
- Source Code:** The original text form of a program.
- Source File:** A file of source code.
- Source Language:** The language the source code is written in, e.g. BASIC, Assembler, C.
- Sort:** To arrange items of data in order.
- Spool:** To output a file to a peripheral, usually either a printer or tape.
- Stack:** A list in which both entries and removals are made at the same end. A microprocessor usually has a hardware stack which is used to save subroutine return addresses, temporary storage of data, and to pass variables between subroutines.
- String:** A sequence of characters.
- Symbolic Name:** A label.
- System:** A collection of hardware and software, possessed of the property that the whole is greater than the sum of the parts.
- System disk:** A disk carrying the operating system.
- Teletype:** An electromechanical printer-keyboard.
- Timeshare:** Running several programs on a system simultaneously.
- Track:** The area under the read/write head during one rotation of a disk.
- Transfer:** To move data.
- Transient:** A program that is only in memory for a short time before being overwritten. Often, the only program that is not a transient is the operating system.
- Tree:** A list in which each data item may refer to several others.
- TTY:** See Teletype.
- Unix:** A multi-user, multi-tasking, multi-programming operating system, expected to appear on microcomputers before long.
- User:** One of the people connected to the computer.
- Utility:** A program of use to most users.
- Variable:** Named quantity that can take on different values.
- Verify:** To check that data written on a disk or tape can be read again correctly.
- Warm boot:** To reload the operating system a second or subsequent time.
- Word:** The amount of data fetched from one memory location. Typically one byte, but can be two on recent processors.
- Word Processor:** A system for manipulating, editing, printing and formatting texts files.
- WordStar:** A proprietary word processing program.
- Write Protect:** To remove the cover from the notch in a floppy disk so that it cannot be written on.
- Zilog:** Manufacturer of the Z-80 and Z8000 microprocessors.
- Z80:** A popular 8-bit microprocessor.

Your CP/M Computer

Continued from page 91

the network server of a CP/NET network and it was in this mode that DR demonstrated it.

Gary Kildall said: "The performance improvement is unbelievable on network systems like this." At the moment the M-disk is still in the development stage and has yet to appear in DR products but will probably appear first in CP/NET products.

Book Review

CP/M, A Self Teaching Guide by Fernandez and Ashley, John Wiley and Sons, ISBN 0 471 08011 X. This is an excellent introductory guide to CP/M for the first time user. While not all the fine detail of CP/M is covered, all the important aspects of becoming familiar and

confident with using CP/M are there. The reader is tested for comprehension after each new concept is introduced and there are review exercises at the end of each chapter.

This should not be considered a reference book for experienced CP/M users due to its self teaching approach but it is just the thing for, say, the small businessman who has just bought a CP/M system to do his business accounts or the secretary who has to learn how to use CP/M to run Wordstar.

My copy cost \$13.60 from the Technical Bookshop, Sydney.

More Join CP/M

MORE AND more new manufacturers are choosing CP/M as the operating

system for their hardware. Now the first of the traditional "big names" in the (big) computer industry has joined the CP/M family. Xerox offers CP/M as the DOS for its 820 information processing system. This product, which is keenly priced in the US, can also be configured as a word processor with a Diablo 630 daisywheel printer.

In the "hot rumours" department at the moment are CP/M adapters similar to the Apple "Softcard" for the PET/CBM range of microcomputers and the Hewlett Packard 85 microcomputer. Also a CP/M emulator for DEC PDP-11 minicomputer systems, reported slow but useable. □

—Bill Bolton

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TI-99/4 Home Computer Users' Group of Sydney; contact S. Andersen, PO Box 101, Kings Cross, 2011. Phone Shane Andersen (02) 358 6662.

Newcastle Microcomputer Club; contact Gordon Johnson, Electron Microscope Unit, University of Newcastle. Phone in business hours Gordon Johnson on (049) 68 5045. Meets 7.00 pm, second and fourth Mondays of each month, Room G12, Physics Building, University of Newcastle.

MEGS (Microcomputer Enthusiasts Group); John Whitlock, PO Box 3, St Leonards 2065. Meets third Monday each month, Wireless Institute Australia Hall, 14 Atchinson Street, St Leonards. 7 p.m.

NSW Apple Users Group; John Smith, 1A Wallaro Road, Double Bay 2028. Phone (02) 36 5696 for more information.

Commodore Users Group; John Guidice, GPO Box 4721, Sydney 2001.

Compucolour Users Group; Andrew Mac-

Intosh, 91 Regent Street, Chippendale, Sydney 2008

80-AT, The Australian 8080-Z80 Users Group; PO Box 165, Lakemba 2195

Wollongong Computer Club; Paul Janson, 14 Hoyward Street, Kanahooka 2530, or 'phone (042) 61 5451

Sorcerers Users Group; PO Box E162, St James, 2001. Ian King, 15 Forest Avenue, Wahroonga 2076, or 'Phone (02) 48 6072

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Sorcerer Computer Users (Australia); Secretary, PO Box 144, Doncaster 3108

Compucolour Users Group; L. Ferguson, 12 Morphett Avenue, Ascot, Melbourne 3342

SMUG; SCORD M100 users, Robin Miller, 60 Winmalee Drive, Glen Waverley 3150

National ZX80 Users Club; 24 Peel Street, Collingwood, Victoria, 3066

BUG 80; Burwood Users Group, PO Box 46 Blackburn South 3130.

Geelong Computer Club; Peter McKeon, PO Box 93, Geelong 3220

Apple Users Society of Melbourne; contact Bruce Leister, 18 Elphin St, Newport 3015. Phone (03) 391 3926. Meets once a month, first Saturday or Sunday, at 3 Alma Rd, Camberwell.

Northern and Western Suburbs Computer Users' Group; contact CP/M Data Systems, 284 Union Rd, Moonee Ponds, 3039. Phone John King (secretary) (03) 338 9304

QUEENSLAND

Brisbane Youth Computer Group; A. Harrison, PO Box 396, Sunnybank 4109.

AUSTRALIAN CAPITAL TERRITORY
MICSIG' Registrar, PO Box 446, Canberra 2601.

TASMANIA

TEMOS; John Stephenson, 4 Melinga Place, Tarroona 7006, or phone (002) 27 8770.

SOUTH AUSTRALIA

Adelaide Micro User Group (TRS-80 and System 80 Users); contact R.G. Stevenson, 36 Sturt St, Adelaide 5000. Meets 7.30 pm first Thursday of the month, Unley Community Centre, behind Unley Council chambers.

South Australian Microprocessor Group Inc (SAMG); contact The Secretary, PO Box 113, Plymton, 5038. Phone (08) 278 7288. Meets 7.30 pm, second Friday of each month, Thebarton High School, Ashley St, Thebarton.

WESTERN AUSTRALIA

Sorcerer Computer Users of Australia; contact the secretary, 90 King St, South Perth 6151. Phone (09) 367 6351. Meets first and third Monday of each month at the Computer Building, West Australian Institute of Technology, Hayman Rd, Bentley.

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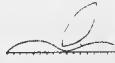
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